

100% ACORN

Acorn

COMPUTING

FREE
COMPLETE MULTIMEDIA
CONSTRUCTION KIT WORTH
£55

PHOTO CD

All the facts about getting
camera images on your micro

AUGUST 1993 ACORN 32-BIT VERSION **Acorn MegaDisk** No. 11
COMPUTING

BOOKBINDER
EXCLUSIVE FROM MUSBURY CONSULTANTS
Complete and fully
interactive text and
graphics construction kit

10 out of 10*
Maths: Number

EXCLUSIVE
10 out of 10
for all
systems

PASSED
CHECKED FOR
ALL KNOWN
VIRUS ES

SURVEY
Your chance to win £250 and
make your opinions known

Plus 4 MORE
COMPLETE
PROGRAMS

No coverdisk?
ask your newsagent



THE ColourCard

FOR THE ARCHIMEDES

MORE RESOLUTION
MORE COLOURS
MORE SPEED
LESS FLICKER



HATS OFF TO COLOURCARD



A new graphics accelerator card for the Archimedes, the ColourCard brings a host of improvements to the video capabilities of any Archimedes A300*, 400*, 540 or 5000 series computer.

The simple to fit, single width expansion card is completely compatible with all RISC OS desktop software, but brings much higher screen resolutions at higher screen refresh rates (less flicker and easier on the eye).

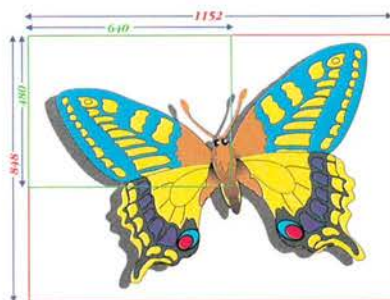
In 16 and 256 colour screen modes all the colours are selectable from 16 million hues. This means scanned pictures can be seen with 256 true grey-levels on screen and that you are no longer restricted to the preset Acorn palette. Some applications, such as ArtWorks, can provide better screen colouring using the new palettes.

In addition, the ColourCard offers 15 bit-per-pixel true colour screen modes having over 32,000 colours on screen at once. Although these screen modes are not yet desktop software compatible, it is expected that programs will become available that take advantage of the modes. The ColourCard is supplied with a 24-bit preview utility to show 24-bit Clear files in stunning full colour.

The ColourCard reduces the load on the main Archimedes memory and so allows the ARM processor to run much faster than would normally be possible in high resolution screen modes. Depending on machine and screen mode, graphic operations can be up to twice as fast.

The ColourCard revolutionises DTP and graphics work, and opens up the world of true-colour graphics to the Archimedes user for the first time.

The ColourCard has been developed and is backed by



ColourCard offers 3 times the pixel area of standard Acorn VGA mode 27.

the largest and most successful Archimedes developer. It is available now, and for added peace of mind comes with a 14-day, no quibble money back guarantee.

KEY COLOURCARD FEATURES:

- ArtWorks version 1.1 now supports 32,000 ColourCard screen modes
- Video pass through for guaranteed compatibility with all software without having to unplug your monitor
- 15 bpp (ie 32,000 colour) screen modes
- No quibble money back guarantee
- A3000 version now available
- New configurable screen update speed

(The ColourCard is compatible with all multi-scanning monitors. †Only higher scanning rate monitors can manage 1152 x 848 resolution. Lower scanning rate monitors may display some resolutions at lower refresh rates. *A300 and early A400 computers may need an additional Genlock connector to be fitted internally.)

Price £249.00 +£6 p&p + vat (£299.62 inc)
Available from all good dealers and from:



15 Witney Way, Bolden Business Park,
Bolden Colliery, Tyne & Wear, NE35 9PE
Tel: 091 519 1455 Fax: 091 510 1929



Computer Concepts Ltd
Gaddesden Place, Hemel Hempstead,
Herts, HP2 6EX
Tel: 0442 63933 Fax: 0442 231632

E&EO Details are subject to change without notice.

SOME OF THE SUPPORTED SCREEN RESOLUTIONS

1600 x 600	65Hz
1024 x 768	72Hz
1152 x 848	64Hz†
1280 x 512	80Hz
800 x 600	85Hz
1152 x 424	80Hz
800 x 300	80Hz
576 x 424	90Hz

16 colours

256 colours

32,000 colours

220 OUTLINE FONTS £169 AND A COPY OF ARTWORKS FREE!

In fact the 220 fonts comes free with ArtWorks, but it does emphasise the extraordinary value for money that ArtWorks offers.

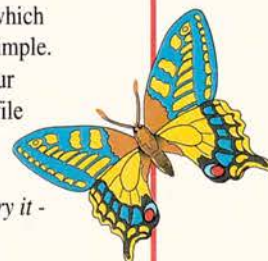
ArtWorks has been acclaimed by numerous reviewers as quite simply the best drawing and graphics program for the Archimedes. It offers features found on no other drawing program, be they on Acorn, Apple Mac or PC computers; features such as anti-aliased drawing and lightning fast graduated fills, and infinite undo - there are far too many to list here. Recent performance figures indicate that the redraw speed of ArtWorks on an A5000 computer is as fast as an Intel Pentium based 64-bit PC - and around three to four times faster than the fastest 486 based machines.



ArtWorks is not only fast, but also easier to use than the alternatives, which makes it suitable for all drawing and illustration work, no matter how simple.

Yet it also provides professional illustration tools, such as full colour separations, overprint control, CorelDraw, Freehand and Illustrator file compatibility, amongst many others.

And finally we offer a no quibble money back guarantee. Buy it, and try it - you have nothing to lose, and a great deal to gain.

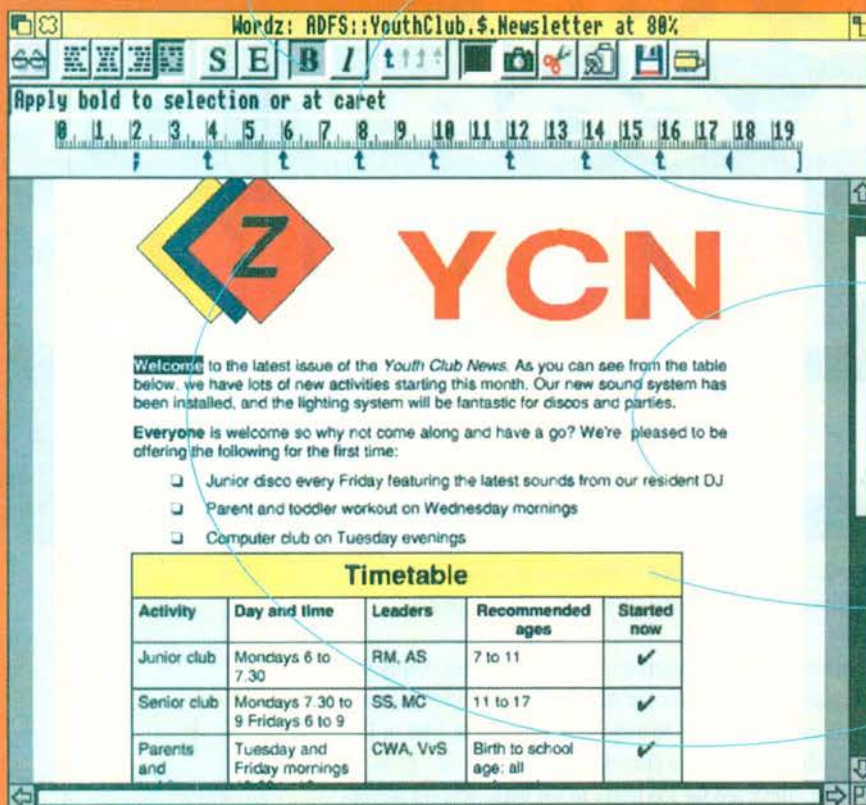


ArtWorks £169 +VAT (£198.57 incl.)



Computer Concepts Ltd

GADDESSEN PLACE, HEMEL HEMPSTEAD, HERTS. HP2 6EX
TELEPHONE: 0442 63933 FAX: 0442 231632



At last, the word processor the Archimedes has been waiting for. A program that's so easy to use you'll be able to create great-looking documents the first time you use it. The facilities used most are in the *button bar*, and the *status line* gives you instant feedback. Just click and drag in the *ruler* to set margins and tabs; click on a button to cut and paste - it's that easy.

Wordz has all the features you'd expect from a state-of-the-art word processor. The powerful style editor gives you complete control over all aspects of your text; *font*, *spacing*, *margins*, and *colour*. Unparalleled control over *tables* including dragging to resize columns and rows. Speedy check-as-you-type or whole document spell checking. Import *pictures* and text from other programs, including PipeDream.

Wordz is the first of a family of programs which share the same easy user interface and include dynamic data linking. The spreadsheet Resultz will be available in mid-1993.

Wordz costs £99+VAT. "Is it easy to use? It's falling-off-a-log easy to use."

word[®] "Z" [©] TM
1993...A...

for a free Wordz brochure, complete and return this coupon

name

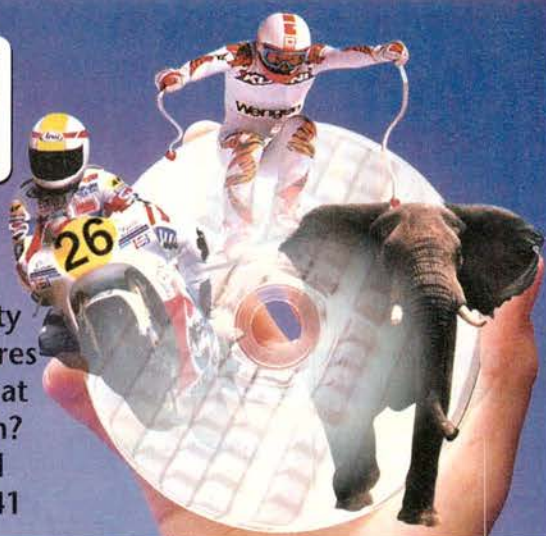
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COLTON software

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Fax 0223 312010

Photo CD

Capture your snaps on CD-Rom. It's not just a dream: It's complete reality – you can have your pictures put on a Gold CD. But what do you do with them then? Find out with our detailed feature starting on Page 41



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Is Virtual Golf really like the real thing? Find out on Page 78

MONEY BACK FOR SUBSCRIBERS

Subscribe to Acorn Computing and benefit from our unique cash-back offer! Turn to Page 38

WHAT NEXT?

Check out Page 9 to find out what's up and coming in the next issue of Acorn Computing – on sale August 12

The editorial and many of the adverts in this magazine were prepared using Impresssion and ArtWorks by Computer Concepts.

Acorn COMPUTING MegaDisk

BOOKBINDER

Complete and fully interactive text and graphics construction kit

SURVEY

Your chance to win £250 and make your opinions known

£200 FIRST PRIZE

in our reader survey

Britain's best Acorn cover disk contains hours of fun and a host of useful utilities linked to our editorial features to make the magazine come alive on your desktop!

Full details about the packed MegaDisk – see Page 6.

August subscription disks

This month's exclusive Acorn Computing subscriber-only disks features an excellent selection of quality software.



The Archimedes disk contains:

- Ultimate Patience games
- Reviews Index
- All the 8-bit listings
- Plus some great PD software



The BBC Micro disk contains:

- Maze duel
- Waterworks plumbing extravaganza
- Blockin – fit the pieces together
- Sprint fund raiser

The MegaDisk

**EXCLUSIVE
SUBSCRIBER
DISK**

See pages
23 & 24

BookBinder: Create your own interactive text

THIS program from Musbury Consultants originally retailed for £55 but you can now have your own full copy free of charge courtesy of this month's MegaDisk.

The phrases *multimedia* and *hypertext* can be difficult to understand but BookBinder is a gentle introduction to the concept of integrating different media to produce interesting results.

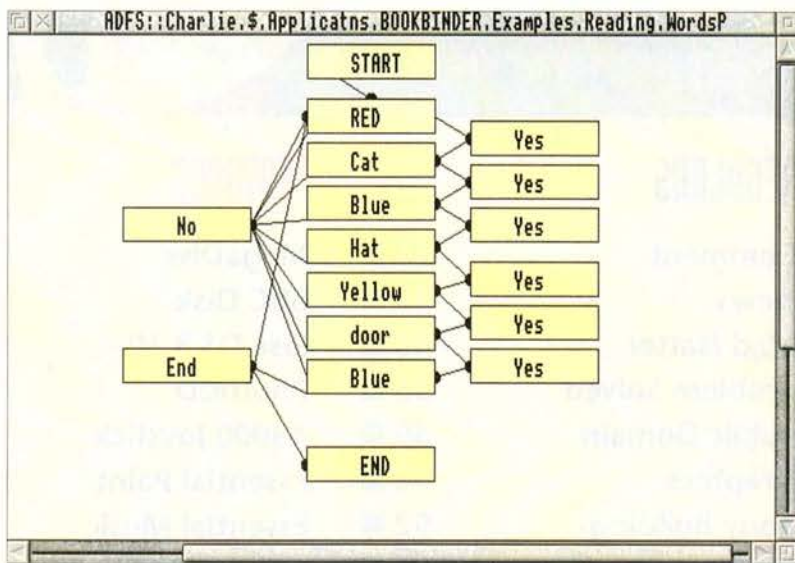
The full manual can be found on disk as a textfile which can be printed out as it is or loaded into your favourite word processor or DTP package. As BookBinder is multi-tasking you can have the text on screen as you work – memory permitting, of course.

As the name suggest BookBinder allows you to create multi-tasking books which can have many uses. One simple use is with multiple choice questions – if the the correct answer is clicked the book goes to the next, if incorrect it can show some revision material.

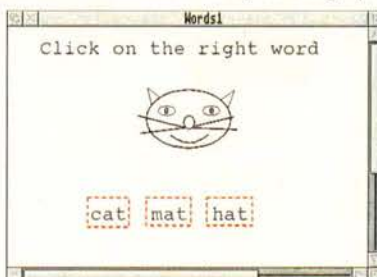
Children are often encouraged to read by stories presented in interactive book form, and given the right book structure they can decide on the outcome of the story.

A graphical database might consist of a picture of an object like a map. Clicking on various sections of the map bring up more detail or information about that region while presentation software can be used for exhibitions and open days to explain some part of the exhibit.

All of this is achieved simply by

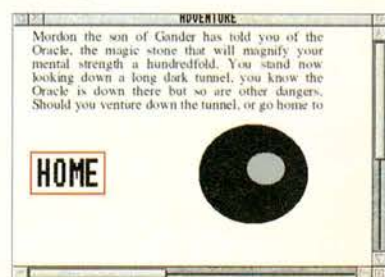


● BookBinder has an easy-to-use graphical interface



● You can teach ...

dragging icons – there is no need to write any code. Despite this simplicity, BookBinder is a powerful specialised programming system capable of producing a wide variety of books. Once finished the book



● ... or play

may be copied to disk and sold, or freely distributed and, in the true spirit of the desktop, more than one book can be opened at the same time.

A BookBinder book is a collection of pages created using Draw, Paint and Edit that come as standard with the Acorn computers. This allows you to create pictures using objects, bit-mapped images and text.

The pages of the book are then stitched together using Binder. At its simplest each page can have a message *Click here to get to the next page* while more complex books could require you to click on a picture of a cup in order to indicate that it has been picked up.

Getting started

THE programs on this disk are stored in a highly compressed format which sometimes enables as much as 1.6Mb of programs and data to be stored on a 800k floppy disk

The procedure for running the programs is very straightforward and does not require learning any special methods or techniques.

Switch on your Acorn micro, put the disk in the drive and click the drive icon. Now double-click !ACmenu – there's a short pause while it scans the

archive then it displays a window of the contents.

You can treat this new window like any other one for viewing disk contents, you can run programs and open directories by double-clicking them.

Large programs must be unpacked by dragging on to a separate disk before being run. Some may have an !Install program that will do it for you.

We recommend that you always read the !ReadMe files or access the help information via the Help button.

10 out of 10 Maths (Number): Arithmetic challenges

ALL the elements of this collection of Maths challenges are available in our Megadisk version of the successful 10 out of 10 Maths (Number) package, including the National Curriculum Assessment Chart and the ability to print out any certificates you win.

10 out of 10 Maths (Number) follows some of the essential parts set out in Attainment Target 2 – Number from the Mathematics National Curriculum. The precise areas covered are given when you select Player Information from the main menu.

There are six educational games covering 36 topics and they combine education and fun with many built-in elements to keep you coming back for more.

Progress can be seen via the high score tables and by looking at the Achievement Chart. You'll turn each box completely green if you gain full marks on everything.

For details on how to load and play the games, a help file is included on the disk which we'd suggest you read before you play – it's in the *Disk1* subdirectory.

However, due to the size of this

What's on offer

Carnival: A shoot-'em-up to check your number skills along with your fire power.

Cover Up: Match the items on the bottom half of the screen – sounds simple doesn't it?

The Big Bang: The temperature on the thermometer is moving fast – how fast depends you. How long can you delay the Big Bang?

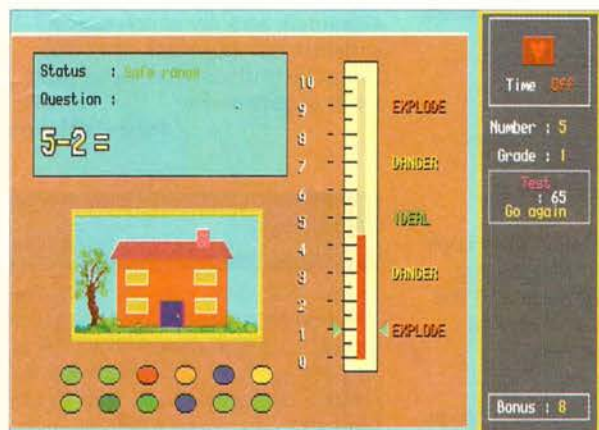
Grab It: Answers are displayed somewhere on screen. Once you spot them move and grab

Silicon Brain: A mathematics program where you don't have to work anything out

Cheers: A fast-action quiz game to keep you on your toes

program, you must de-archive it on to two separate 800k disks before you try to run it. We have provided an installation program to do the job automatically – it will format the disks as well so you don't need to do that.

If you get an error about the module area size you must increase the space using the Task Manager



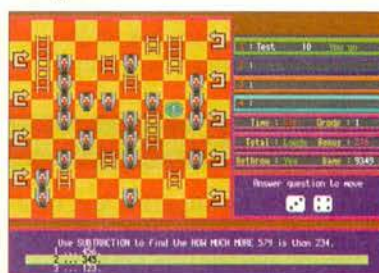
● With Big Bang you have to hold down the temperature

Information Data		
Subject	NC	Grade
Addition	2b.1	1
Estimation	3d.2	2
Multiplication	4a.14	3
Units	5d.1	4
Powers	5d.4	5
Fractions	6b.2	6

● National Curriculum information for one game

window, then try running the installation program again. If you really can't get it to work you can de-archive the programs manually by dragging. The first disk must be called 10/10Maths1 and the second, 10/10Maths2.

Then you can play six games full of skill, fun and challenge for 8-16 year olds. Your skills will take you on to the next levels though you can use the special features to jump to higher levels.



● Cheers has its ups – and downs

Test: Achievement Record 10/10 Mathematics demo Number - RT2									
SUBJECT	Correct	Cover Up	Big Bang	Cover Up	Big Bang	Cheers	Cheers	Cheers	Cheers
Addition	2b.1	4a.4	3a.2	4a.4	2b.1	2b.1	2b.1	2b.1	2b.1
Subtraction	3a.4	3a.2	4a.5	2b.2	2b.2	2b.2	2b.2	2b.2	2b.2
Multiplication	4a.2	3b.1	5a.3	3b.2	2b.3	4a.14	4a.14	4a.14	4a.14
Division	3a.2	4a.18	5a.4	7a.2	4a.4	4a.4	4a.4	4a.4	4a.4
Fractions	6a.4	6a.4	6a.4	6a.4	6a.4	6a.4	6a.4	6a.4	6a.4
Percentages	3b.2	6a.10	6a.8	6a.10	6a.10	6a.10	6a.10	6a.10	6a.10
Estimation	8a.1	8a.1	8a.1	8a.1	8a.1	8a.1	8a.1	8a.1	8a.1
Units	5d.1	5d.1	5d.1	5d.1	5d.1	5d.1	5d.1	5d.1	5d.1
Powers	5d.4	5d.4	5d.4	5d.4	5d.4	5d.4	5d.4	5d.4	5d.4

● The full layout for National Curriculum development

DATAVISION SPECIAL OFFER

Exclusive to readers of *Acorn Computing* who received DataVision Lite on the July '93 MegaDisk. For a limited time, the full 90-page manual with technical support is available for just £17.95. It will provide all the details necessary for creating true relational business applications.

☐ Cheque enclosed ☐ Please debit my Access/Visa card

Number Expires

Signature

Name

Address

Postcode

SEND TO: Acorn Computing, DataVision Lite Offer,
Europa House, Adlington Park, Macclesfield SK10 4NP

10 OUT OF 10 SPECIAL OFFER

If you want to upgrade to the full version of Maths (Number), 10 out of 10 Educational Systems are making a special offer to all *Acorn Computing* readers.

You can get a free full copy when you order any other 10 out of 10 product. Just fill in this coupon and send it off with your order.

☐ I would like to take advantage of the 10 out of 10 Acorn Computing Special Offer. I understand that this offer cannot run concurrently with any other.

Name

Address

Postcode

SEND TO: 10 out of 10 Educational Systems, 1 Percy Street, Sheffield

The MegaDisk

Wanna sell some software?

ACORN COMPUTING is always in the market for good quality applications, utilities and games to put on the MegaDisk and Subscription disk. If you think your program has got what it takes just send it on disk to: MegaDisk Submissions, Acorn Computing, Europa House, Adlington Park, Macclesfield SK10 4NP.

Next month on the MegaDisk

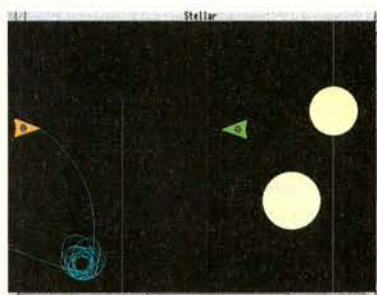
Artists are well catered for on the Acorn machines and next month the full commercial version of Imagery can be found on the Acorn Computing MegaDisk. Imagery normally retails for £90 but this superb multi-tasking program from Palette Studio can be yours – if you don't subscribe make sure you don't miss it by putting your order in with the newsagent today. The September disk will also feature adventure and challenge as well as a host of useful utilities and programs.

Stellar: Seek and destroy

DO you remember the tank battle games from the BBC Micro days? There was a tank on one side of the screen, one on the other and then you took turns trying to blow the other one up? Well, just as the original machine has been improved beyond all recognition, so has the game, now called Stellar.

Here's a *unique* opportunity to fire non-guided tactical nuclear projectiles at up to three of your most feared enemies or friends in the comfort of your own desktop. Stellar is a deadly accurate solar combat simulator, where the projectiles' paths are influenced by nearby masses.

So load it up, and click on the icon to see the map. Each player



Missed!

owns an interstellar blaster vehicle, proudly displaying the player's number, getting one shot per turn in true boardgame style. The exit velocity is defined by a vector from the end of the ship and just a single

shot will destroy any player it hits.

The options page enables certain variables to be set and you can have one to four players. The more participants the more interesting the scenario.

Number of singularities and planets are individually definable and can be randomised or fixed as you wish. Singularities – black holes – have similar masses to moons, but are invisible. Note that inaccuracies in the simulation are due to as quantisation of time and they allow interesting slingshot effects.

The Gravitational constant can be altered. It starts as a realistic $67 \text{ pNm}^2/\text{m}^2$, but can be negative if required – only slightly negative values give interesting games.

One last thing, bullet lifetime is limited because occasionally very stable orbits can be produced lasting absolutely ages, by which time suspense has dispersed. After this time, the warhead disappears in a whiff of dark matter.

Paul Carpenter

MegaDisk Questionnaire: Your point of view

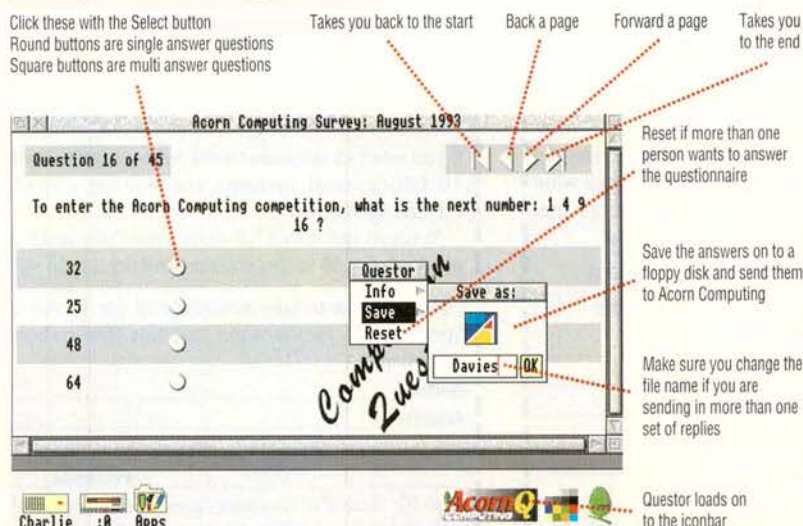
This is our 10th MegaDisk and we'd like to hear what you think of the magazine and the disk since our relaunch as Acorn Computing in October 1992. For letting us know what you think we are giving away £500.

The Questionnaire is on the disk and once it's loaded on to your iconbar you can work your way through the questions using the buttons. When you've finished, save your replies on to a floppy disk and

make sure that it reaches us by September 30.

One of the questions is a competition and the first correct answer chosen at random will receive £200, and next 30 will receive £10 each.

As many people as read your copy of the magazine can enter, as you can reset the questionnaire and the next set of answers can be saved under a different filename.



JoyFix: Adding control to your A3010

Some older games do not recognise the new Acorn Joystick SWI so JoyFix is simply an A3010 joystick fixer. This is needed as many of the older games require knowledge of which file to run and also how much screen or sprite memory they require. This is because they support an older standard SWI which won't allow for analogue joysticks but makes life easier for programmers. JoyFix supports this standard.

Even older games do not support any joystick. To get around this uses Keytraps which intercepts attempts to read the keyboard and instead checks the joystick.

You can create your own *Obey files for the games you want using Edit because the *joykeyset command can be put in any obey file and full help information is included with the program on the disk.

Jamie Briant

WHAT'S COMING IN THE NEXT ISSUE OF ACORN COMPUTING



MegaDisk

Following our policy of bringing you the very best in computer software we are proud to present the multitasking graphics editing program, Imagery from Palette Studio, worth nearly £90.

This superb program allows you to edit 256 colour pictures from the Desktop unlike any other painting package. It has dozens of facilities including graduated fills, shading and tinting across the whole image or on selected areas.

- And we have a two-page tutorial feature covering the main features provided by Imagery allowing you to build up superb pictures and illustrations.

- Plus Amazing Maths, a demo of the great new educational game system from Cambridgeshire Software House
- All the programs from the magazine.

PocketBook

Reviews are all very well but what's the Acorn PocketBook like to use? A whole team of users took a really good look and this is what they found out about it.



Networks

The final part of our enlightening series about what Ethernet is, what it really does and how it works. With this series you'll be able to make informed decisions about your networking requirements.

Arcade Games

The return of your regular arcade games feature with a brand new games wizard giving you hints and tips galore, game cheat modules on the cover disk plus what's hot and new on the games scene.

Regulars

- The best news from home and abroad plus new software and hardware releases from the Acorn family.
- Our Essential series covering the basics of Music and Painting using your Acorn 32-bit micro.
- Problem Solved, Mike Cook tackles your hardware problems with clear explanations and advice about what you can do when disaster strikes.

Be sure you'll get your copy by filling out the coupon below and handing it to your newsagent. Or why not take out a subscription and have the magazine delivered direct to your door with two disks every month. Take a look on Page 38.

 **Acorn**
COMPUTING

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Please reserve a copy of Acorn Computing magazine every month until further notice

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Note to

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New Acorn Hardware

Official Acorn Publishing Dealer

A540 4Mb Ram, 120Mb HD	£1995.00
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c/w Acorn shoulder bag	£1699.00
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Arm 3, Acorn Multiscan Monitor	£1399.00
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as above c/w software	£1445.96
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Arm 3, Acorn Multiscan Monitor	£1599.00
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Arm 3, Acorn Multiscan Monitor	£1299.00
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Arm 3, Acorn Multiscan Monitor	£1399.00
A4000 Home Office System	
Arm 250, Acorn Monitor	£999.00
A4000 Home Office Multiscan System	
Arm 250, Acorn Multiscan Monitor	£1049.00
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Arm 250, Acorn Monitor	£949.00
A4000 HD 80 Multiscan System	
Arm 250, Acorn Monitor	£999.00
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Arm 250, TV Modulator	£424.68
A3010 / 2Mb Learning Curve System	
Arm 250, Acorn Monitor	£680.00
A3020 / 2Mb FD System	
Arm 250, Acorn Monitor	£749.00
A3020 / 2Mb FD Multiscan System	
Arm 250, Acorn Multiscan Monitor	£799.00
A3020 / 2Mb HD 60 System	
Arm 250, Acorn Monitor	£899.00
A3020 / 2Mb HD 60 Multiscan System	
Arm 250, Acorn Multiscan Monitor	£949.00

**A Finance option is available
on the above machines
(14.7% APR)**

Written details available on request

Acorn Special Needs Centre We operate the Acorn Teacher and Academic Schemes

Please call for free information packs

A540 Upgrades

4Mb Ram Upgrade	£299.00
Taxan 795 VIDC Modes Disc	£7.50
Technical Reference Manual	£65.00

A5000 Upgrades

2Mb Ram Card	£110.00
Dust Cover (One piece)	£12.95
Technical Reference Manual	£65.00

A3000/10 Upgrades

1 Mb Ram A3010 (2Mb in total)	£39.00
4 Mb Ram A3010	£128.00
A3010 to AKF12/17 adaptor	£9.95
1 Mb Ram (2 Mb in total)	£45.00
4 Mb Ram	£128.00
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A4 Shoulder Bag	£35.00
A4 Technical Reference Manual	£65.00

RISC OS 3

RISC OS 2 -> 3.1 Upgrade	£41.70
RISC OS 3 -> 3.1 Upgrade	£16.17
RISC OS 3 Hardware Kit A300	£25.00

Expansion Cards

Econet Module	£46.00
Hawk V9 Video Digitiser	£199.00
I/O Expansion Card	£79.00
Midi Expansion Card	£65.00
SCSI Expansion Card (Acorn)	£229.00
SCSI Expansion Card (Morley)	£149.00

ROMBO Colour Digitisers

A3000 inc. podule housing	£72.30
A400 / A5000	£72.30

Aleph 1

Arm 3 Upgrade	£175.00
386 PC Expansion Card 1Mb	£390.00
386 PC Expansion Card 4Mb	£485.00
486 PC Expansion Card 4Mb	£585.00

Standard Monitors

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Notate	4maton	£10
Note Invaders	Longman	£42
Number 62 HoneyPot Lane	Chalksoft	£20
Numbers and Pictures	Resource	£29
Numberscope	Chalksoft	£20
Number Zoo, age 3-6	Fisher-Marriott	£19
Numerator	Selective	£14
Numerator Chaos	Longman	£39

Oak Logic	Oak	£79
Oak PCB	Oak	£79
Oh No! More Lemmings (requires Lemmings)	Krisalis	£15

Ollie Octopus' Sketchpad

age 4+	Storm	£12
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Omar Sharif's Bridge

	Krisalis	£19
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Orion	Minerva	£8
Orrery	Spaceteck	£93
Ovation	RISC	£84
Overload	Clares	£13

Padlock - site licence	ICS	£10
Pandora's Box	Fourth Dim	£15

Pappus	Computer Tutorial	£17
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Paradroid 2000	Coin-Age	£22
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PC Emulator 1.8	Acorn	£93
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PDT	Oak	£149
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Pendown	Longman	£46
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Pendown Etoiles	Longman	£49
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Pendown Outline Fonts	Longman	£19
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Pendown Plus	Longman	£68
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Personal Accounts	Apricote	£29
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Perspectives	TechSoft	£44
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Pesky Muskrats	Coin-Age	£19
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Phonic Games	Fisher-Marriott	£28
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Picture Book	Triple R	£15
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Picture It!	Appian	£29
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- Topic discs	each	£9
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PinPoint	Longman	£65
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- site licence		£390
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PipeDream 3	Colton	£72
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PipeDream 4	Colton	£119
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PipeDriver Dot 1	ICS	£10
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Pipe Mania	Empire	£18
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Pirate, age 8-14	Chalksoft	£19
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Placard	ICS	£10
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- site licence		£30
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Plague Planet	Alpine	£13
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PlayBack	RISC	£19
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Play It Again Sam 1	Superior	£20
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Plot	Clares	£POA
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Podd, KS1.2	ESM	£27
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Podd - Welsh, KS1.2	ESM	£38
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Polyominoes	Topologika	£29
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Populous	Krisalis	£22
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Poster	4maton	£75
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PowerROUTER	Silicon	£159
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Prehistoric Animals, sprites	Micro Studio	£16
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Programming in ANSI Standard C on the Archimedes	Sigma	£15
Prophet (requires 2 Mb)	Apricote	£132
Prophet Entry Level	Apricote	£10
Protext	Amor	£117
Provocator	Computer Tutorial	£15
Puncman 1 and 2	Chalksoft	£16
Puncman 3 and 4	Chalksoft	£16
Puncman 5 to 7	Chalksoft	£18
Punctuate	Xavier	£31
Punctuate!	Topologika	£25

Quest for Gold	Krisalis	£19
QuickKey	ICS	£10
- site licence		£30

Real McCoy 2

Real McCoy 3

Real McCoy 4

Recall, age 8-13	Sherston	£37
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Redshift	Minerva	£10
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RemoteFS	Atomwide	£48
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Render Bender 2	Clares	£78
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Repton 3	Superior	£20
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Resultz	Colton	£POA
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Revelation 1	Longman	£39
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Revelation 2	Longman	£75
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Revelation 2 CD Rom	Longman	£98
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Revelation ImagePro	Longman	£127
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Reversals	Chalksoft	£17
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Rhapsody 2	Clares	£45
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Rhapsody 3	Clares	£79
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Rhythm-Bed	Clares	£39
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RhythmBox II, age 8+	EMR	£34
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RiscBASIC Compiler	Silicon	£79
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RiscForth Compiler	Silicon	£79
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Risc OS 3 Programmer's Reference Manual	Acorn	£99
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Risc OS Companion Vol 1	Oak	£49
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Risc OS Extras 1992	Acorn	£9
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Risc OS Style Guide	Acorn	£12
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RoboLogo	Silicon	£39
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Round the World Yacht Race, age 9+	Storm	£27
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Saloon Cars Deluxe	Fourth Dim	£25
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- Deluxe Extra Courses	Fourth Dim	£16
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S-Base Developer

	Longman	£150
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S-Base Developer Plus	Longman	£275
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S-Base Network	Longman	£275
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S-Base Personal

	Longman	£79
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Schema	Clares	£95
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Schema 2	Clares	£POA
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Science, drawfiles	Micro Studio	£25
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Score Draw	Clares	£44
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Scorewriter PMS Desktop, age 12+	EMR	£147
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ScreenPlay	Widgit	£35
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ScreenTurtle	Topologika	£44
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Search and Rescue, age 9+	Storm	£27
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Seashore Guide, drawfiles	Micro Studio	£16
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Seelinks - Ourselves, KS1.2 ESM		£27
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Seelinks - Pond Watch, KS2 ESM		£35
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Seelinks - Tourism, KS3 ESM		£35
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Seelinks - Transport, KS2 ESM		£35
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Serenade	Clares	£106
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Settlement, KS3	ESM	£31
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ShapeFX	Data Store	£10
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ShareHolder	Silicon	£106
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ShareHolder Professional	Silicon	£234
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ShowPage	CC	£145
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Splice	Ace	£29
Split an Image, age 7-16	Sherston	£16
Spoken Word	Wyddfa	£16
Spooler	Computer Tutorial	£9
Sporting Triangles	CDS	£19
SportsDay	Selective	£22
SportsPeople	Selective	£22
SpriteEd	Computer Tutorial	£17
SpySnatcher	Topologika	£12
Square Route	Computer Eyes	£16
Starspell Plus	Fisher-Marriott	£19
StartWrite	Icon	£55
StockPack	Topologika	£37
StoryBook, age 3-10	EMR	£59
StrongED	Stallion	£22

Studio24Plus Version 2, age 11+	EMR	£149
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Studio24Plus Version 3, age 12+	EMR	£210
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SUMthing	Resource	£19
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SuperDump	Silicon	£20
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Superior Golf	Superior	£14
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SuperPlot	Silicon	£20
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Supersounds	CIS	£15
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Supersounds 2	CIS	£15
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Swiv	Krisalis	£19
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TABS

Talisman	ExpLAN	£95
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Talking Pendown	Minerva	£8
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Talking Pictures	Longman	£58
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Target Maths	Wyddfa	£16
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Technodream (Nevryon 2)	Triple R	£15
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TechWriter	Superior	£20
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ThinkLink	Icon	£159
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ThinkSheet	Xavier	£29
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Thundermonk	Fisher-Marriott	£38
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Tiles	Minerva	£11
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Timeshare	Brain Games	£16
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Timetabler	Fisher-Marriott	£19
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Time Traveller, KS2	Minerva	£549
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- Britain Since the 1930s, KS2	ESM	£37
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- Expansion, Trade and Industry, KS3		£30
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- Making of the United Kingdom, KS3		£36
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- Medieval Realms, KS3		£36
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- The Victorians, KS2		£30
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TinyLogo/Draw	Topologika	£34
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TinyPuzzle	Topologika	£24
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Titler	Clares	£119
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Toolkit Plus	Clares	£36
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Tools Graphics, drawfiles	Micro Studio	£23
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Topographer	Clares	£63
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Touch Type

	Iota	£35
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Tower of Babel	Cygnus	£17
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Trace	David Pilling	£5
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Tracer	Midnight	£46
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Tracker	Leading Edge	£37
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Transport, drawfiles	Micro Studio	£25
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Turbo Type	CIS	£20
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Twain	Ace	£30
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Twin World	Acorn	£24
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TWO (Task and Window Organiser) ICS	UBI Soft	£14
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- site licence		£10
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TypeStudio	RISC	£39
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Utility Disc 1

Utility Disc 2	Data Store	£8
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Utility Disc 3	Data Store	£13
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Utility Collection	Data Store	£7
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	Data Store	£21
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Vector

View»Mac 3	4maton	£75
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- Arc/Mac Cable	Human	£65
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Viewpoints, age 7-11	Human	£24
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Virtual Golf	Sherston	£37
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Visual Backup	Fourth Dim	£25
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Vox Box	Dabhand	£42
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	Clares	£46
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Waterloo (not OS 3.1)

Whale Facts	Turcan	£19
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WindowEd	Topologika	£34
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Word Bank	Armen	£27
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Words and Pictures	Topologika	
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DeskJet 550C	Hewlett-Packard	£475
Laser Direct HiRes4	CC	£899
- 250-sheet Paper Cassette		£99
Laser Direct HiRes8	CC	£1275
Laser Direct HiRes Board	CC	£325
Refill toner cartridge for Canon EPS		£50
New toner cartridge for Canon LBP-4		£59

COMPUTERS...

A3010 1MB FD Family Solution	Acorn	£420
A3010 2MB FD Learning Curve with Monitor		
- as above + JP150 Printer	Acorn	£675
A3020 2MB FD	Acorn	£749
A3020 2MB HD60	Acorn	£899
A4 2MB FD	Acorn	£1395
A4 4MB HD60	Acorn	£1695
A4 4MB HD80	Acorn	£1699
A4 4MB HD120	Acorn	£1799
A4 Extra Battery Pack	Acorn	£50
A4 Shoulder Bag	Acorn	£35
A4000 2MB HD80	Acorn	£945
- as above + Home Office		£995
A5000 2MB HD80 Multiscan	Acorn	£1395
- as above + Learning Curve		£1455
Pocket Book	Acorn	£212

MISCELLANEOUS...

386 PC Expansion Card 25 MHz	Aleph One	
- 1 Mb		£374
- 4 Mb		£468
486 PC Expansion Card	Aleph One	
- 1 Mb		£463
- 4 Mb		£557
4-slot 4-layer Backplane	IFEL	£52
9060S Monitor	Eizo	£450
A300/400 Fan kit	ICS	£15
A3000 Expansion Box	Wild Vision	£135
A310 RISC OS Carrier Board	IFEL	£18
A5000 Fitting Kit for second hard disc		
	ICS	£15
Arkey Function KeyStrip Holder	ICS	vo £3
- pack of 4		vo £10
ArNET	ACS	£69
ARM3	Aleph One/IFEL	£165
ColourBurst	State	£322
ColourCard	CC	£225
- A3000 External	CC	£225
Dongle Dangle with screw fittings	ICS	£6
Fan filters (pack of 10) (not A5000)	ICS	£6
FaxPack	CC	£289
Floppy Discs, 10 x 3 1/2" High Density		£10
G16	State	£258
G8 Plus	State	£238
G8 Plus Video Switch	State	£23
HiPoint Mouse for A4	Genius	£49
Microlin fx Pocket Fax Modem	Pace	£179
Micro Mouse	Clares	£26
Monitor Stand for A3000	ICS	£21
Mono/SCSI	Atomwide	£48
Module Case for A3000	HCCS	£16
Printer/SCSI	Atomwide	£74
Print Port Sound Sampler	Leading Edge	£42
Publishing Pack	CC	£475
RISC OS 3 Upgrade	Acorn	£42
- Bulk package	Acorn	£335
- A5000	Acorn	£19
Seal 'n Type spill-proof Keyboard Covers		
- Archimedes / A5000	Kador	£14
- A3000	Kador	£14
TouchWindow	Lindis	£234
Whisper Fan Quietener		
(for A300/A400 series only)	ICS	£15
Wizzo IDE Filing System on rom	ICS	
- Wizzo4 for A4		£29
- Wizzo5 for A5000		£29

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Padlock is our top seller for simple disc security.

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As well as letting you type all those extra characters, Special is the easiest way to examine new fonts.

HOW TO ORDER

VAT: Zero-rated items are marked V0. UK customers please add 17.5% to all other prices. EC customers outside the UK (including BFPO) please do the same unless you are VAT registered, in which case quote your international VAT number. Ours is GB 595 7258 84.

CARRIAGE IS FREE WITHIN MAINLAND UK IF YOU PAY ON ORDERING.

Overseas carriage: If you are paying by credit card we will add airmail and insurance at cost. Otherwise please add £6 (Europe) or at least £12 (elsewhere) for each software item and send a pounds sterling bank draft payable at a London clearing bank, or Eurocheques for not more than £100 each.

Credit cards are welcome. We do not charge your account until your order is fulfilled. Your name and address must be as known to the credit card company. If you are leaving an order on our answering machine please include your telephone number, the expiry date of your card, and your calculation of the total payment due. We will make no charge for credit card commission unless we have informed you first.

Official orders are welcome from UK government and educational institutions. Payment is due in 14 days. Invoices are subject to carriage and late payment charges.

Site licences are available for most products. Please check our prices.

All products, prices and specifications are offered in good faith and are subject to change without notice. We process all orders immediately, but suppliers do sometimes keep us waiting. Goods are guaranteed but we do not supply them on approval. Returns and cancellations can only be accepted by prior agreement and there may be a charge to cover the costs involved.

AUTHORISED ACORN DEALER

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Dept AC11, 1 Kington road, West Kirby, WIRRAL, Merseyside, L48 5ET

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Fax: 051-625 1007

Suicide is painful

ON the face of it the Tesco tie-up with Acorn is great news. Just think about it, Acorn get national advertising for their machines without even trying – in a place where a large proportion of the general populace do their shopping.

It's a brilliantly simple idea: Just go to Tesco's and for every £5 of goods you buy you get a voucher. Trade in enough vouchers and you get goods worth a certain value ... who remembers collecting books and books of Green Shield stamps? Of course, it only applies to schools, but that's a decent cause to donate to.

Schools have a fantastic opportunity to get hardware and software – just bus-in hundreds of OAPs and collect their vouchers. Tell the children's parents to stop going to Asda, Safeway, Sainsbury's or the Co-op and transfer their allegiance to Tesco's, albeit temporarily, and collect their vouchers too. You'll soon have enough for a new computers or software.

The scheme is now in its second year – it ran for three months the first time and three months this year, but got extended by Tesco because it was so successful. Now hang on a minute, what's this word *successful*?

Successful for who? It was Tesco who extended the scheme, after all they're the ones who are at the front end. Why would they extend it? Because it's making them money, of course.

Look at it this way: Due to the value of the vouchers (different whether you're buying hardware or software) it's been estimated that you need to buy £15,000 of

groceries for a £60 piece of software. The average family probably has a grocery bill of at least £60 a week so it requires just 250 family-weeks of shopping to produce the right number of vouchers.

But all in the garden is not rosy – you might try asking the producers of educational software what they think of the deal. But we didn't have to ask them, they came to us.

The way things are organised, each software house is asked by Acorn to submit two or three software packages to them so that Acorn can choose one to take part in the scheme. If you're lucky enough to have a product chosen it gets put in the list of what a school can buy with the vouchers they've saved.

Then, during the time the scheme runs, you lose all the direct sales of that product to schools which, if you have lots of products, means you haven't lost very much and you must have gained a great deal in terms of promotion and possible new customers.

At least one can only assume that's what Acorn thought was going to happen when they signed the deal with Tesco. How naive. This is what *really* happens:

Up to three months before the scheme begins the sales of *all* educational products starts to drop off as schools begin to think: "I can get these products for free soon, I won't buy now." For at least a month or two after the scheme there's the same problem of no sales, so you get half the year or more of almost no income.

Even if a company aren't in the scheme they still lose out: Let's say that a company has a wordprocessor

in the scheme. Because it's there it kills the sales of *any other* wordprocessor or similar product regardless of who produced it.

So by ensuring there's a wide selection of software in the scheme, Acorn have also guaranteed that educational sales are thoroughly crippled and so put the software producers into severe financial difficulties.

Another company told me of a situation where someone was interested in buying a product but explained that they were waiting for the scheme to buy it. When told it wasn't in the scheme the reply was: "You'd better do me a good deal then otherwise I won't buy it."

Acorn have signed a fixed term contract with Tesco on this so there are more years to come. Given the recession, the size of the market and now this, how much longer can the software producers survive the devastation wrought by Acorn's "clever idea"?

I'm not going to dictate to schools that have very little cash and a desperate need for resources, but what good's a machine when there's no one producing software for it any more? Remember Tesco are the only real winners, and they don't give a damn about Acorn.



Tesco's promotion seemed like a good idea at the time – but Steve Turnbull puts a different light on it

Steve Turnbull – Editor

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The ideA range

ICS was the first company to offer IDE products for Acorns back in 1990; now they are the standard choice for new Acorn computers. Building on three years' experience we have continually improved our IDE filing

system. It now offers the highest level of RISC OS compliance, and compatibility with at least 45 different hard discs tested by us. Can any other supplier make this claim?

Our IDEFS abolishes the RISC OS limit of 512 Mb, and offers extra features such as password protection, background operation, disc partitioning, and power saving (which allows some discs to stop spinning when idle).

Partitions can have different levels of protection. Family or pupils can access some of your files while you keep others safely out of their reach. Or you can simply protect the whole disc (reformatting is not required for this).

Our hard disc upgrade kits are based around two internal interfaces at present: IDEA3IN for the A3000 Series, and IDEARCIN for the A300/A400/A500 Series. All kits are designed to a high standard and include all the parts you will need.

IDEA3IN upgrade kits include an I²C expansion socket as standard. They come with a 2½" disc already attached, and are easy to fit once you have opened up your computer. False rumours have been spread in the past (by sellers of SCSI hard discs) that internal upgrades might not be safe in an A3000. In three years we have never heard of an actual problem, but please ask Acorn's Technical Department if you wish to be reassured.

IDEARCIN upgrade kits provide a fast 16-bit link all the way from the computer to the hard disc. They can even be fitted to an A310 without a backplane – quite a cost saving. A second hard disc can easily be added later if required.

Interfaces and hard discs can also be bought separately. By shopping around you may even save a few pounds. But beware: not all IDE hard discs work with all interfaces, and if you have a problem it may be difficult to decide who should put it right. We recommend buying a complete kit from one source.

WIZZO is the name given to our IDE filing system when it is supplied as a single rom chip. Wizzo5 is for the A5000, and Wizzo4 is for the A4. You should buy a Wizzo if you need password protection or wish to use larger hard discs. (Wizzo4 has been delayed slightly – we are adding a feature to ensure compatibility with possible future A4 upgrades).

A Wizzo rom by itself will only produce a slight speed improvement. If you need speed in an A5000, fit an IDEARCIN interface instead. Up to 60% improvement can then be achieved, but this does depend which hard disc you use so do check with us first.

How to read our ideA product references

A number at the end is the nominal hard disc capacity in megabytes. We usually round this down, so the actual formatted capacity may be higher. All discs have auto-parking. Average access times vary but all are below 20 ms.

All prices shown exclude VAT and are subject to change without notice. The cost to us for hard discs can vary enormously from week to week – not always downwards! Your local dealer can obtain *ideA* products from us or from a distributor.

Archimedes A300/A400/A500 Series Internal Upgrades

Package includes formatted hard disc, *ideA* interface card, hard disc cradle and fittings, fan kit, replacement multi-purpose LED (power and drive status), manual with fitting instructions. Can be fitted to an A310 without a backplane. If a backplane is used it must be a 4-layer type. Easily fitted by most users.

IDEARCIN 80	£225	IDEARCIN 240	£425
IDEARCIN 100	£255	IDEARCIN 330	£500
IDEARCIN 120	£275	IDEARCIN 426	£575
IDEARCIN 170	£305	IDEARCIN 540	£799

A3000 Series Fully Internal Upgrades

Package includes formatted hard disc mounted on *ideA* interface card, manual with fitting instructions. Fully internal, using internal expansion slot. Co-exists with floppy drive and memory upgrades. Fits the new 1992 computers. Easily fitted subject to Acorn warranty stipulations.

IDEA3IN 40	£225	IDEA3IN 120	£350
IDEA3IN 60	£275	IDEA3IN 130	£450
IDEA3IN 80	£325	IDEA3IN 209	£499
A3000 FAN KIT (not usually required*)			£19

*Only required if the computer has been fully upgraded, e.g. with maximum memory AND Econet AND an external podule.

Separates for hard disc upgrades

We can only guarantee the performance of *ideA* interface cards with hard discs we have tested ourselves, so please check if in doubt. If you are buying a hard disc for an A5000 please say so. If you intend to fit the disc in addition to an existing one we need to know the make and model of the existing disc. Acorn's interface does not support all makes of disc, and some models will work as a second disc but not on their own.

Hard discs on their own are listed as, for example, IDEA 80. An S at the end indicates a 2½" disc.

IDEARCIN (Archimedes Interface for Internal disc(s))	£60		
IDEA3IN (A3000 Interface for Internal disc)	£75		
ARCHIMEDES INTERNAL CRADLE KIT	£15		
ARCHIMEDES A300 / A400 SERIES FAN KIT	£15		
4-SLOT 4-LAYER BACKPLANE	£52		
POWER CABLE FOR SECOND HARD DISC	£5		
A5000 SECOND HARD DISC FITTING KIT	£15		
IDEA80	£179	IDEA240	£350
IDEA100	£215	IDEA330	£470
IDEA120	£245	IDEA426	£499
IDEA170	£275	IDEA540	£750
IDEA40S	£140	IDEA120S	£299
IDEA60S	£200	IDEA130S	£399
IDEA80S	£245	IDEA209S	£449

WIZZO IDE Filing System on rom

Package includes rom, manual and fitting instructions. Compatible with RISC OS 3.0 and 3.1. Allows up to four logical partitions over two physical drives. Each partition appears separately on the icon bar and can have different password protection. Makes use of existing Acorn hardware for maximum compatibility, but works with a wider range of hard discs. Security breaches using ADFS can be prevented. Can be fitted easily by a competent user.

Available now: WIZZO5 for A5000 introductory price £29
Available soon: WIZZO4 for A4 introductory price £29

Quantity discounts available • Dealer enquiries welcome

Autumn showtime

ACORN'S very own show is planned to take place from October 29 -31 at the Wembley Exhibition Centre. The theme of Acorn World '93 is *Vision for the Future*. The futuristic themes will include a series of dedicated feature areas showing glimpses of technological innovation in publishing, home and business.

Did you know?

WHAT is hot, wastes paper and in Europe alone uses two power stations' worth of electricity each year, and, what is more, by the year 2000 will be consuming 10 per cent of the world's power supplies? The answer is computers and McGraw Hill (0628 23432) have published a book by Steven Anzovin called *The Green PC*. This contains more than 100 practical ways to reduce the environment costs of computing for just £7.95.

DTP aid

DEC_DATA (0392 221702) have some resource disks which will be of interest to anyone involved with DTP using Ovation or Impression. Impression and Impression Junior Resource disks cost £7.95 each with the Ovation disk priced at £8.95.

These resource disks hold useful artwork in drawfile format and borders, for instance, as well as a directory of Help files on Borders, DropCaps, Masks and so on giving you hints and tips to problems experienced by most people new to DTP.

Supporting C

THE C User Group UK have decided to form a new sub-group to concentrate on C programmers in the Acorn world. They will have their own magazine CAUGers (C Acorn User Group) which will be sent to members bimonthly.

This will contain tutorials on C and Risc OS function necessary to program the Wimp as well as hint and tips.

To join you need to be a member of the C User Group and full details can be obtained from the Subscriptions Secretary (William Anderson) 18 Heath Drive, Binfield Heath, Henley-on-Thames, Berk-shire RG9 4LX.

Bursting out in full colour

STATE Machine (0582 484266) have moved to Unit 4 Stopsley Business Centre, St Thomas's Road, Stopsley, Bedfordshire LU2 7UX and have released three products to complement their G8 and G8 Plus graphic accelerator cards.

The G16 takes the features of the G8 Plus and improves the display of Risc OS modes on VGA monitors and new 16-bit per pixel high and medium resolution screens.

With the G16 you can preview Acorn Replay files in 16-bit per pixel modes and the new look mode selection application is stored in rom appearing in the standard Risc OS Apps directory.

The TrueView application displays 16/24-bit files in any 16-bit per pixel modes with user-selectable gamma correction.

Finally, the PalMaker application calculates the optimum palette of any user-selectable area of the screen. This gives near 16-bit quality with applications while keeping the full editing of the object in the desktop. All this for £279.

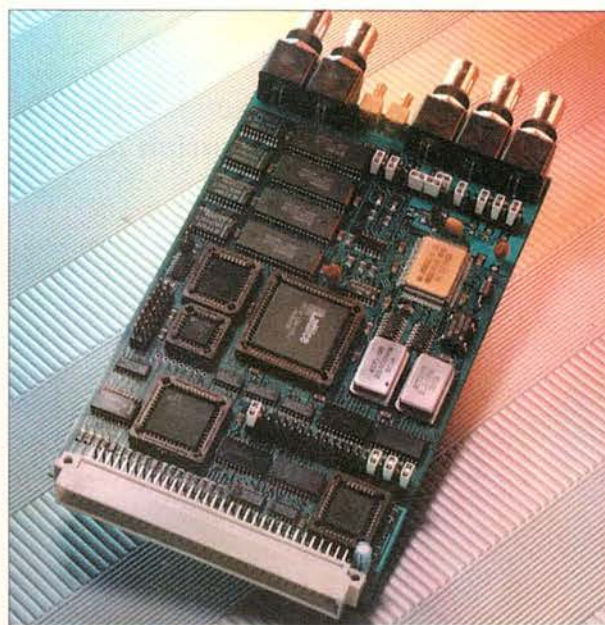
An interesting extra is the Video Switch which costs £10 or £19 for the A5000 – when bought with the G8 Plus or G16 – and is for those of you who have 15KHz+ line rate monitors which require 100 per cent compatibility with *illegal* coding such as is used in games, for instance.

This switches out the graphics card output when it isn't needed which displays the standard Risc OS generated modes without unplugging the monitor.

Just completed is the ColourBurst Graphics Card which is a full CCIR PAL, television and video recorder compatible graphics card for the A3000, A5000 and A300/400/500 series.

The card can display a full interlaced overscan TV mode with the desktop running – double the usual vertical Acorn TV resolution – which makes it ideal for training videos, demos where access to a large TV-type monitor is available.

A full range of adaptor cables is available so any monitor can be connected to the card. ColourBurst provides the same facilities and comes with the same software as the G8, G8 Plus and G16 but has a host of features of its own such as a



larger desktop, ArtWorks and TrueView preview modes, direct recording to video and online broadcasting.

The ColourBurst is fitted with an on-board expansion system to allow various options to be added yet take up no more expansion slots. Look out for a simple synchroniser, an RGB bandwidth limiter, a composite PAL and S-Video encoder, full PAL genlock expansion and an internal RGB video switch for the A540 and A5000.

● The powerful ColourBurst card

● State Machine's range promises higher resolution and better colour

Cards, ports and drives

A NEW low-cost user port and analogue card is always welcomed by education and HCCS (091-487 0760) have released one for £59 which fits the A5000, A300 and A400 series.

HCCS have also added an internal IDE 40Mb hard disk to their range of Diamond and Ultimate drives. The cost is £228 for the A3010, £219 (with User Port) for the A3000 and only £199 for the A3020.

STEP UP TO EUREKA v.2 AND SAVE OVER £40

EUREKA brought the power and innovative features of the very latest in easy-to-use spreadsheet technology to all RISC OS users. And now EUREKA version 2 has even more to offer you:

In fact, there are over 100 individual improvements upon version 1, including extended documentation and a fully comprehensive index.

What's new in Eureka version 2

- Scale printing of worksheets and print-to-fit a single page
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- Chart series editor for direct editing of data series
- Automatic line of best fit for scatter charts
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- Save a selection as a worksheet, Lotus 123 file, CSV, SID or drawfile

If you already use another RISC OS spreadsheet, here's an offer you just can't refuse!

Just tell us what it is, and where and when you bought it, and we'll supply you with a full copy of EUREKA version 2 at the unrepeatable special offer price of £82.10 (£99.99 including p&p and VAT). That's a saving of over £40 on the RRP.

But remember, this very special launch offer must end on the 17th of September, 1993, and definitely will not be repeated. Don't be disappointed, claim your own copy of EUREKA version 2 today!

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Making the grade

WHEN it comes to national radio and TV computer games coverage the Acorn range is conspicuous in its absence. This era came to an end on July 1 when Matt Black's (0733 315439) Spheres of Chaos was given a rave review by Dominik Diamond on Steve Wright's afternoon show on Radio One.

With comments such as: *The most colourful game I've seen in my life* and *The most addictive game I have played in a long time*, Dominik Diamond gave author Ian McLeod some much deserved national recognition.

Television support

ANGLIA TV Education (0603 615151) are supplying a range of new support packages to complement the Channel 4 Schools service. Anglia have also taken on the complete development of the Key range of software, including the element previously supplied as a joint service by ITV Schools.

New Key packs to look out for are The Earth in Space and In Tudor Times. These cover areas of Key Stage 2 and have been designed for use with KeyNote on the Archimedes. The datafiles can be used with Key Plus and cut-down versions can be used with Key.

A third package, The Civil War, is aimed at Key Stage 3 and supports another How we Used to Live unit. It can be used with KeyPlus on the Acorn 32-bit with some additional spreadsheet material in Key Calc format.

Joy for games players

MATT Black (0733 315439) have a permanently installed joystick interface kit with four joystick ports. This fits internally in all the Acorn 32-bit range but leaves the podule slots and parallel connector free.

The Gamer's Upgrade also includes a filter for crystal clear stereo sound and provides two permanently installed phono-type connectors while leaving the existing speakers and output unaffected. The price is £27.99.

Enhanced artwork

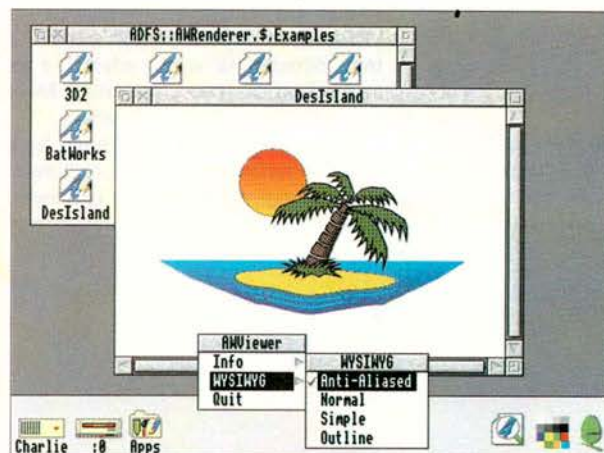
COMPUTER CONCEPTS (0442 63933) have released an AWWViewer application to complement ArtWorks. It allows someone to view pictures drawn using ArtWorks even if they haven't got it.

AWViewer is the second application after Impression 2.19 to include the AWRRender module which draws ArtWorks files on to the screen or prints them.

Now other companies can add AWRRender to their programs so that ArtWorks files can be included in other applications such as databases. If the application is not a rival to ArtWorks the necessary licence is free, otherwise the producer will have to pay.

With reports of 5,000 copies of ArtWorks sold so far it is not surprising that users have requested a whole host of additional tools to enhance it from bit-map tracing to better text handling.

Because of its object-oriented design, adding new tools to ArtWorks is relative-



ly easy, so Computer Concepts have released a tool developer pack so you can now create your own for £10. The pack includes source code files and an Impression disk-based manual, but you have to be able to program.

● AWWViewer is a quick and easy way to see what you're missing

Graphic design showdown

IT looks as if battle is about to commence in the printing, publishing and graphic design area between Acorn/Digital Arts and Apple/Adobe.

Digital Arts are working on a retouching program called DA Picture and as well as developing direct-drive imagesetting from Acorn's 32-bit machines, this is similar in concept to Computer Concepts' and Calligraph's direct drive laser printing systems but produces the images on photographic film for professional printing.

DA Picture is an advance on their Retouche Professional software which is

widely used in Germany, Austria, Switzerland and the Benelux countries. DA Picture will probably be priced around £200.

Traditionally the Acorn models have been dismissed in the print trade as education machines. Commenting on this Acorn's Simon Woodward remarked: "The biggest misconception is the equation of low power with education."

"The printing industry is populated by people who are more after a solution than a brand. We're offering the user ease of use and speed."

More power to the turbos

THE TurboDriver range from Computer Concepts (0442 63933) has increased again to include drivers for Canon and HP colour and monochrome inkjet printers – Canon A3 BJ-230 and HP Deskjet, DeskJetPlus, DeskJet 500, colour 500C and 550C – now one for the Epson Stylus 800 inkjet.

The last offers 360 dpi printing at a similar price and quality to the Canon BJ-200 and HP DeskJet 510. The cost of all TurboDrivers is £49 but you will need Risc OS 3.1 and 2Mb of ram.



Virtual adventures in store

FOLLOWING close on the heels of Fourth Dimension's (0742 700661) Virtual Golf comes Demon's Lair – a three dimensional arcade adventure set in the land of Kaxiyo, and Stunt Racer 2000 – a car driving extravaganza.

Kaxiyo is peaceful place ruled by a friendly dragon but with the capture of the sovereign by a demonic pretender,

the land is now a realm of ghosts and fiends. As famine threatens, someone must be chosen to destroy the Demon.

Naturally a brave warrior was chosen but soon killed. A lottery was announced and guess who drew the short straw? Demon's Lair is priced at £25.95.

Stunt Racer 2000 costs £34.95 and is a stunt car game with ramps, jumps, mid-air twists and loops from the authors of Chocks Away. Winning is all important. Coming third will give you enough prize money to survive but you'll need that expensive turbo boost to qualify for the next track.

You'll need all your wits about you to control the power drift on tight bends and make sure that you're fast enough to reach the off ramp of the mid-air crossroads. Finally, your fellow racers are not known for their scruples.

● Stunt Racing in the future promises spills and thrills



● The package for professionals at home

Packaged solutions

BEEBUG (0727 840303) have put together three hardware solutions. At £899, the A3010 Home Professional System comes with a 20Mb hard disk, 2Mb ram, Acorn colour monitor and software worth over £300 – saving £500.

For the portable market the Beebug has an A4 with a fast 210Mb hard disk and 4Mb of ram for £1,829, while users who need high capacity storage should take a look at the A5000s with 450Mb hard disk and 4Mb ram for £1,799 or 900Mb hard drive and 8Mb ram for £2499.

New lamps for old — any brand

A POPULAR marketing strategy at present is the one HCCS and Longman Logotron are both dabbling in.

HCCS (091-487 0760) are offering their new Ultimate Expansion System when you trade-in most makes of IDE internal hard drive. The old hard drive is transferred in to a new Ultimate Expansion system for £100 – if this is a HCCS Diamond IDE drive the data is pre-

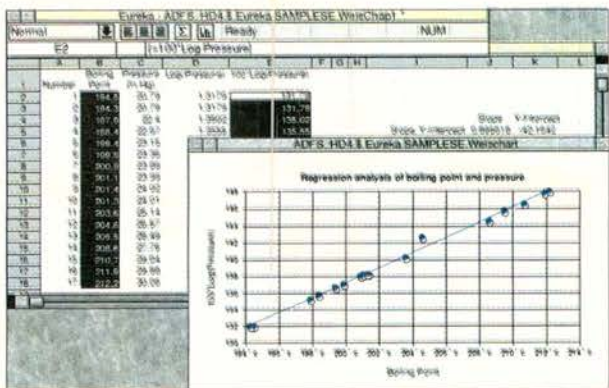
served. Contact HCCS directly to find your nearest participating Acorn dealer.

If you need expandability this can save you the cost of a new machine. For instance, an A3000 can be modified with two Ultimate Expansion Systems, one inside with a hard drive, and one outside to give you more expansion slots than an A5000 or A540 – five slots, a user port plus a hard drive.

On the software front Longman Logotron (0223 425558) want to make you an offer you can't refuse. With the release of version 2 of Eureka, you can save £40 on the RRP if you tell Longman what your current Risc OS spreadsheet is and when and where you bought it. This offer ends on September 17.

All existing Eureka users will receive a completely free upgrade which features scaled printing, customised zoom, worksheet find and replace, the display and printing of formulae and a fully compacting memory manager which dynamically releases worksheets when they are closed.

● The updated version of Eureka incorporates some new features requested by users



Pocket software

SOME useful and amusing budget-priced programs for the Acorn Pocket Book are available from Minders Software (0539 740193).

Dwarfs and Dungeons is an adventure game with the required numbers of dungeons, trolls, treasure, magic and mazes for £8.95.

On a more serious note, Call Coster has found its way from the desktop Acorn to the Pocket Book. This useful application lets you see how much phone calls cost allowing you to set the parameters such as a long distance or local, mobile, time of day and so on. The display is updated to show how long the call has lasted and how much it will cost you. The price is £7.95.

A simple Stock Control program is next which allows you to update a file of products, their stock level, price and reorder level for just £7.95. For the programmer Hex lets you specify a file and you are given a dump of the file in character and hex format. This program costs £5.95.

Computerised algebra

TEN out of Ten Educational Systems (0742 780370) have added to their series of education packages with 10 out of 10 Maths (Algebra) for children between 6 and 16.

This follows the format of Number and English with six educational games covering 10 essential areas of algebra, including patterns, sequences, formulae, graphs, equations, inequalities and symbols.

Progress on the 36 challenges is recorded on a unique assessment record where teachers or parents can monitor success or problem areas without being present as the children work.

A seventh game has also been added to the package to help with the spelling of subject-specific words. WordFit is similar to the game in the English package and it is likely that this feature will appear in all their future products. Algebra is priced at £25.95 and any home or school is entitled to a 14-day free trial.



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Computer Concepts

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A3020 HD 60 System	£899-00 *
A4000 Home Office	£999-00 *
A4000 HD 80 System	£949-00 *
A5000 2M HD 80 Multiscan	£1399-00 #
A5000 Learning Curve	£1445-00 #
A5000 4M HD 176 Multiscan	£1599-00
A4 2M FD System	£1399-00
A4 4M HD 60 System	£1699-00

A540 8Mb RAM, no monitor £1995-00

* FREE multiscan Monitor U/G with these systems !
FREE 2Mb RAM U/G # FREE 4Mb RAM U/G

Power games



Waterworks: Blocking the pipes

THIS is a game to challenge your little grey cells and visual dexterity. It's a puzzle for one or two players and the object is to build as long a length of pipe as possible. Easy, but time is against you.

When the time has run out, water will flow through the piping. This will test just how good your construction is and whether your future lies in plumbing.

The two-player option puts both of you in competition against the clock as you work together to produce the best possible pipeline

with the blocks you've got.

Keys

Action	Player 1	Player 2
Left	Z	.
Right	X	.
Up	F	.
Down	C	/
Place	G	Return

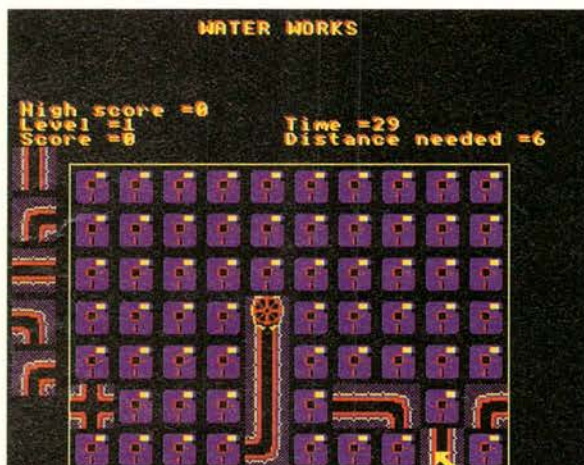
A third game type is the expert game and it is here that one player is faced by two sets of pipes. Fortunately, you can manipulate the section dispensers choosing to

use or discard certain pipe sections. You control the dispensers with the F and G keys.

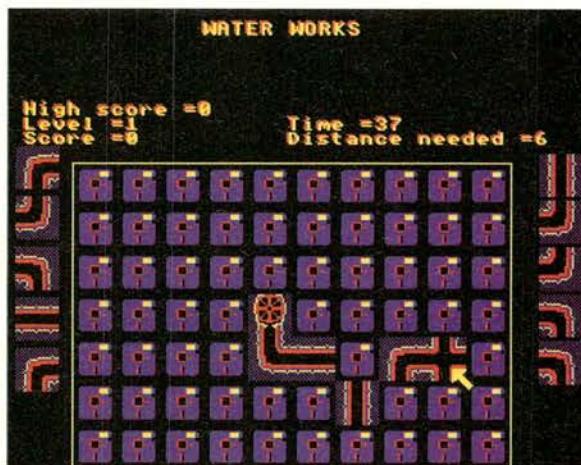
Scoring is quite simple – you get one point for each pipe section you place with half a point subtracted from your score for any unused sections of pipe left over at the end of the game.

If you happen to make a mistake and need to overwrite a piece of piping, place a new piece over it as normal, but hold down the *place* key for about one second.

Michael Elson



● This set of Waterworks is in need of a plumber



● For real frustration opt for the expert game



Don't miss out on the great programs for the Acorn 8-bit machines that you can receive every month. From listings written specially for Acorn Computing readers to an excellent selection of PD programs.

Subscribe now, turn to Page 38

Blockin: Classic arcade action

AS with all good arcade games the principle behind Blockin is simple. All you have to do is to steer the falling blocks down the bucket but make sure it doesn't fill up.

Every time a complete horizontal line is formed, it is removed and the blocks on top will fall down to fill the space.

Keys

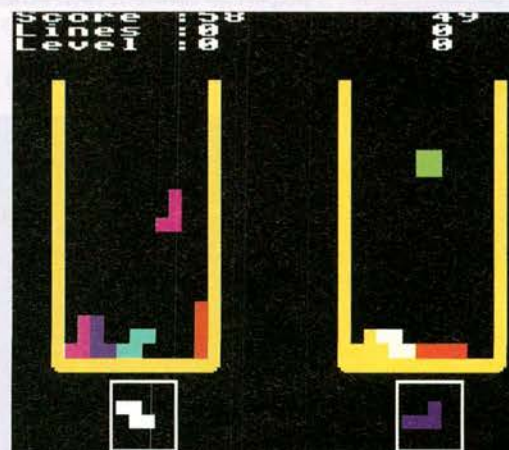
Action	Player 1	Player 2
Left	Z	.
Right	X	.
Drop	C	/
Rotate	F	.

There are one and two player games to choose between as well as a special two player linked mode. Here any blocks taken away from one side are added to the other. Points are awarded for every shape used, as well as a bonus for each line.

Michael Elson

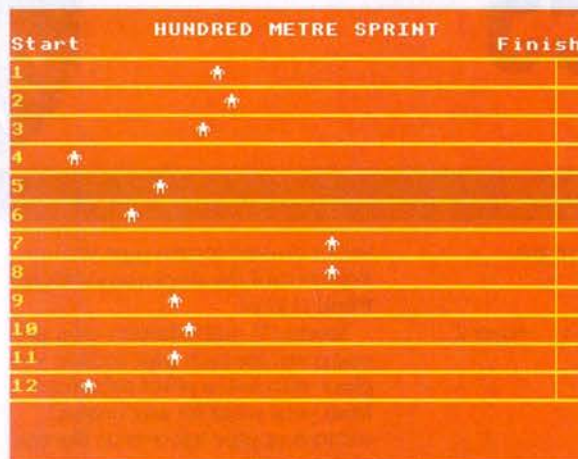


● A version of Tetris to test your reflexes



● The two-player version has a built-in nobbie factor

Sprint: Fund raising the fun way



● You can have up to 12 in your 100 metre sprint

ALMOST every school holds either an annual or term fund-raising event to generate more spare cash for the benefit of its students.

Dreaming up and building new gimmicks out of wood, cardboard and paint can be in itself an expensive and time-consuming job. And such things don't often last long.

So why not enlist the help of the school's trusty old BBC Micro? All it needs is some kind of game which can be based around a principle of random numbers.

The 100 metre sprint given here is an example of such a program: Up to 12 runners compete to reach the winning line first.

Each lane is staked upon by a different individual, and



● It's now time to make the payout

when a profitable number has been taken a race commences.

A graphical display of the competition is given by the micro and when completed the winning lane number is displayed at the bottom of the screen. The owner of this is awarded the prize. If one token is required per lane you'll take 24 tokens each race – assuming all 12 lanes are filled. You can give the winner six tokens back.

To make the sequence of numbers – and the winner – as unpredictable as possible the random number generator is seeded before each race begins. This is done using the *TIME* variable, so is dependent on the real time elapsed since the last hard reset or power-up.

Stephen Wade

FAULTY DISK?

If your subscription disk has a physical fault – doughnut won't rotate in the sleeve, disk errors and so on – please return it for replacement to:

Datapulse Disk
Unit 5
Station Road
Hungerford
Berkshire RG17 0L7

If there seems to be a fault with one of the programs please contact us at the magazine by post describing your machine set-up and exactly what happens when you run the problem program.

Maze Duel: A journey into the labyrinth

DRUNKEN words are said. Offence is taken at the attack on pride. A challenge is set to ensure honour is satisfied.

Under the strange duelling laws of the area, the two antagonists are taken to a cave system beneath the ground. There they must find weapons, food and armour and prepare to confront each other. However, the first challenge is the maze ...

The game is for two players with

the action taking place over 70 screens of tunnels. Duellists start off in a central cave from which they must work themselves through interconnecting tunnels so that they meet and the battle begins.

When your stamina is gone you are out of the game. However, stamina can be increased by eating, armour gives protection. You cannot start to have an affect on your enemy's stamina until the armour is destroyed.

In order of power the weapons are: Axe, trident and arrows.

Though the axes are powerful they have a limited range while arrows are lighter and travel much further.

May victory go to the right. A map is available of the Duelling maze and you can get a copy if you send a SAE to:

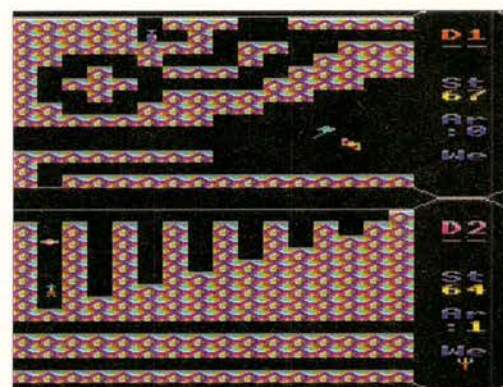
*Maze Duel/Acorn Computing,
Europa House, Adlington Park,
Macclesfield SK10 4NP.*

Paul Hallam

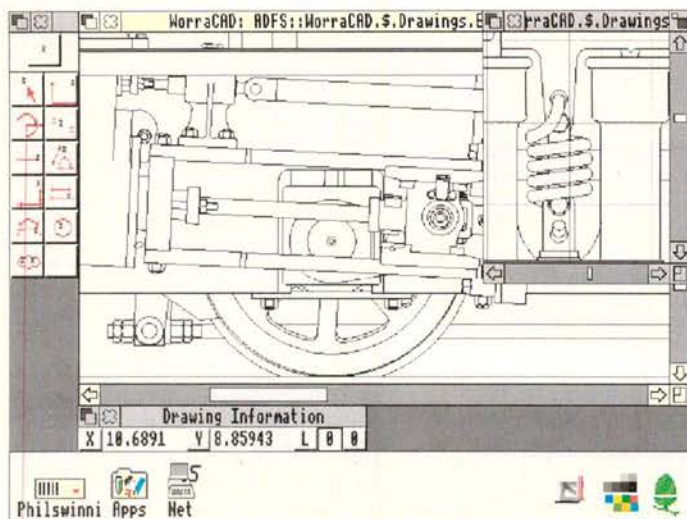


● Remember the icons for weapons and food – your life depends on it

● Duellist 1 has found the axe, but his opponent has armour and now a choice of two weapons



Technical Drawing for RISC OS



WorraCAD is a 2D technical drawing application for the Archimedes desktop. It has been designed to be a truly practical tool, ideally suited to dealing with the everyday problems associated with precision 2D draughting.

WorraCAD is unique amongst CAD applications for RISC OS in that it uses a floating point, rather than an integer model to represent its data internally. This avoids major problems with respect to accuracy and maximum drawing area. Highly optimised code ensures speedy performance in spite of the extra calculations required.

WorraCAD has seen many improvements over its lifetime, and most recently, has benefited from the addition of ellipses and elliptic arc geometry, and a complete revision of the user interface which is now totally icon driven (although the earlier interface is retained as an option for those who prefer it).

In spite of recent major improvements, WorraCAD's price remains at a very competitive £99.00. Education price is £69.95, and a site licence costs £279.80 (excludes p&p and VAT).

Launched in 1990, WorraCAD was the first CAD system for RISC OS.

After three years of continual refinement, the application has matured into a product essential to anyone creating technical drawings on the Archimedes.



WorraCAD can output files in a wide variety of formats. Drawfiles can be transferred to almost all other Archimedes graphics packages. DXF and HPGL files cater for industry standards.



Technical drawings require the use of different linestyles to show hidden detail, centre lines and so on. WorraCAD provides a range of styles to cover virtually all requirements.



The greatest strength of WorraCAD is its ability to calculate tricky geometric constructions automatically. Tangents, normals, foci and so on can be generated simply by clicking the mouse.



One of the most time consuming tasks at the drawing board is that of hatching. With WorraCAD, you simply select the boundary and any islands to be hatched, click, and the job's done.



WorraCAD allows virtually unlimited scope for zooming in and out. Because of WorraCAD's unrivalled accuracy, even at 500 000 x magnification, the drawing still hangs together.



The grid system in WorraCAD can be set to display in either orthogonal or isometric modes. The vertical and horizontal spacing can be independently adjusted.



Comprehensive dimensioning to BS308 is provided. Dimensions are associative - if the drawing is stretched, the dimension adjusts automatically. Precision and dimension style are easily controlled.



Plotter output is provided using the HPGL format, the industry standard plotter control language. Output can be sent directly to the plotter, or to file for plotting later, perhaps via a bureau.



Printer output goes via the standard RISC OS printer drivers. A preview mode is available, and a monochrome option is provided for output of coloured drawings to monochrome printers.

Move up to WorraCAD and draw your own conclusions



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Please add £1.50 p&p and VAT

HCCS have a reputation for producing high quality hardware for Acorn machines, but is their micropodule really the *Ultimate* Expansion System for the new range of micros?

The multipodule board provides the basis for the system. It costs a surprisingly low £38 and comes in the form of a card – about the size of standard Acorn A3000 podule – which increases the number of

PRODUCT SPOTLIGHT

Product: *Ultimate Expansion System*

Price: *See table*

Supplier: HCCS, 575-583 Durham Road, Engine Lane, Low Fell, Gateshead, Tyne and Wear NE9 5JJ.
Tel: 091-487 0760

expansion ports available to the machine. HCCS have produced their own range of micropodules,

which fit into these ports.

Presently, three multipodule versions are available: The A3010 model has a user port, two micropodule slots and space for an IDE hard drive, whereas the A3020/A4000 board has three slots and a built-in user port.

An A3000 version was released at the Spring show at Harrogate and combines the best features of the other cards in that it has a user port,

Powermonger

Feel the need to expand your hardware? Graham Tyrrell explores the pros and cons of fitting the *Ultimate* system



● The A3010 Multi-podule (left) plus some of the optional extras

three slots and space for a hard drive. A board with two slots compatible with the rest of the Acorn range – except, of course, the A4 – is also due for release soon.

The board itself is remarkably sparse. The micropodules which slot into it are about the size of a credit card with an input port at the back and a set of pins underneath. These simply fit on to the multipodule and are secured by a nut and bolt through the metal back plate.

I would recommend fitting the cards before you install the main board as the slot near the computer's power supply is too close to the casing for the securing nut to be tightened. A similar problem arises when attaching an input cable to the port of this micropodule as the casing gets in the way of the retaining screws.

An external power supply is required when the first micropodule is added. This costs an extra £30 but includes an internal fan and a buffer kit. At first I thought it quite strange that these were not supplied as standard with the board, but it will function as one of the cheapest user ports available without need for external power.

This will be especially tempting in education, with the expansion potential of the Ultimate system for the price of a user port. The power unit itself is quite bulky but the lead which plugs into the card is flimsy with very little protection from damage by pulling on the wires.

Once the podule is fitted, it must be powered all the time the machine is on, whether or not it is being used. This means an extra power socket must be at hand, with the fan constantly adding to the noise of your machine.

Fitting the card is not an easy task and requires at least two pairs of hands. This is not the fault of HCCS but is due to the way the computers are designed. The lead from the floppy drive to the motherboard passes over the podule sockets. If your micro is fitted with an Acorn hard drive, such as in the A3020, its ribbon cable is also an obstruction and so must be held out of the way while the board is slid carefully beneath it.

The manufacturers recommend that this is carried out by an authorised Acorn dealer, but the fitting instructions are comprehensive and easy to follow. Remember, of course, that removing

Adding podules to the Ultimate

The ability to add one or more of a range of third-party podules to the HCCS expansion system enhances the flexibility.

For instance the analogue MicroPodule at £29 is very useful for anyone involved with Special Needs and fits nearly into the the Ultimate system inside the machine.

Now EMR have helped develop two Midi MicroPodules with dual channels incorporating built-in buffering.

A high quality sound sampler is built-into one model providing 8-bit mono sampling at between 5 and 44.1k samples per second as well as provid-

ing 16 software-selectable gain levels of input. The Midi MicroPodules are priced at £69 with the 4 HQ sound sampler and £49 for just Midi.

Other MicroPodules which are available now are: SCSI, Vision, HiVision and Laser Express. Other MicroPodules are under development with the next ones due for release during the next two months including Serial, Colour Video Out and Scanner MicroPodules.

You can have up to three MicroPodules and a User Port fitted internally if you have an A3000, A3010/20 and A4000. Eight is the maximum inside an A5000, A400 and A300 series.

the lid of the machine may invalidate the warranty and precautions must be taken against static which could damage the board or the computer.

When refitting the lid, it is essential that its plastic tabs are properly aligned with the holes at the back of the computer – they have a tendency to snap off easily, as I found out to my cost.

The disk-based manual called *!Emanual* is very crudely written. It requires 610k of memory and will only run in 256-colour modes. This will cause problems for those using a 1Mb machine.

Frankly, I found this to be a waste of a disk, as the information given could have been written in the space on the installation guide which tells you how to load the manual. The software provided on rom detects which cards are installed and these can be listed using the *Micropodules command – useful to ensure they have been fitted properly.

Once the board has been installed, there is almost no limit to the ways in which the computer can be expanded. At present, eight cards are available at about the same price

as the full size podules. These range from a SCSI interface to a Laser Express driver.

HCCS are working on expanding the number of micropodules, with current projects including a Midi interface with built-in sound sampler, a hand-scanner card and Econet compatibility for all the range of micros.

A number of starter packs are available which include the multipodule board, power supply and one or two micropodules and these can be quite a bargain. For example the HiVision digitiser starter pack costs £149, only £20 more than the micropodule itself.

Summing up

The Ultimate expansion system is the only one of its kind on the market at the moment and the tiny size of the micropodules makes you wonder why full size podules were ever needed in the first place.

The cost of the multipodule system is well within everyone's budget, so there is no doubt it will be a success. Apart from a few minor niggles, I would definitely make this a priority on your hardware upgrade list.

The Ultimate range

Model	Slots	User Port	Hard Disk	Power supply provided	Price
A3000	3	Y	Space for HD	-	£38
A3010	2	Y	Space for HD	-	£41.70
A3010	2	Y	20Mb IDE	Y	£220.43
A3010	2	Y	60Mb IDE	Y	£297.02
A3020	3	Y	-	-	£38
A4000	3	Y	-	-	£38
A5000/A540/A400/A300	2	N	-	-	£39

Note: A PSU is needed when the first micropodule is fitted to the multipodule



HAVE you been missing out? In the last six months of Acorn Computing we've had some amazing MegaDisks on the cover and some tremendous articles inside. Here's your chance to get what you've missed.

February 1993

MegaDisk: Ego Repton 4 from Superior Software, five levels of the true 32-bit successor to the early BBC Micro games. Badger Trails from Sherston Software, a brilliant educational game that has everyone playing it. Plus MicroTrader Business System from PRES.

Features: Euro-speak, a round-up of programs that will help you learn European languages. Plus how to use Draw to create 3-D effects.

March 1993

MegaDisk: Interdictor from Clares Micro Supplies, the complete combat flight simulator, worth £36. Clip-art from NW Semerc plus Optima demo.

Features: Colour cards compared, the Computer Concepts and State machine expansion hardware checked for power and usability. A first look at a 20Mb flash card – the memory of the future. Plus unique education supplement.

April 1993

MegaDisk: Last Ninja from Superior Software, first level complete. KeyWord from Really Good Software, the complete desktop thesaurus worth nearly £30.

Features: The new PC cards from Aleph One on test – what's it like to have two powerful computer in the same box? Longman-Logotron's S-Base is put under the spotlight. Plus our second education-only supplement.

May 1993

MegaDisk: Fireball II and screen designer complete from Cambridge International Software plus Treeform, which produces true-to-life fractal trees.

Features: We review Advance a software release from Acorn, a powerful integrated office package with wordprocessor, database, spreadsheet and graphics. Exclusive preview of Almanac, an amazing integrated office tool.

June 1993

MegaDisk: Zool by Gremlin Graphics, the first level of this cult computer game complete with a specially written patch program to give full colour raster bars. Plus HelixBasic, the complete computer language from PDK Technologies.

Features: Drawing package for 2-D and 3-D work are looked at in detail and their relative merits compared as we examine the whole subject of computer-aided drawing. Plus we discover how you can receive TV-broadcast teletext on your machine.

July 1993

MegaDisk: DataVision Lite, a complete database package worth £50. Plus TechnoDream from Superior Software, the first level of this exciting two-player game.

Features: In a special article we list the top 30 DTP utilities and give away some of the secrets of successful page layout. Plus there's the first of our highly praised Networks series.

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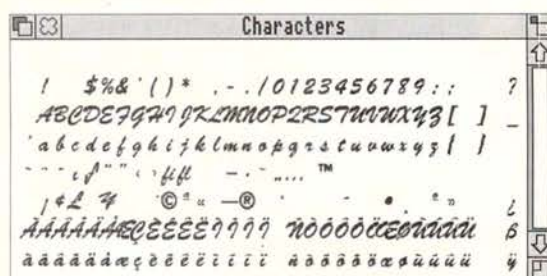
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● It's easy to select the more unusual characters with !Chars



● The whole machine can be tailored to your own preferences



● You can edit Basic programs directly with Edit

Resourceful rom

Geoff Gallacher examines the applications available from within Risc OS 3

IN the July issue we covered some of the new functions of Risc OS 3.10. This month, I want to concentrate on the rom-based applications from the Resources: Filer.

So let's start with !Alarm which has been considerably enhanced over the old Risc OS 2.00 version and now has many more options, including the ability to run applications at a pre-set time.

This is called a Task Alarm and can be executed from the choice of options now presented in the extended *Set alarm* dialogue box. With the Alarms icon on the iconbar just click it with Select which brings up a window with a button for *Task alarm* and click this to enable the task alarm option.

The message area now becomes a command buffer and any text typed in here will be issued as a command when the alarm goes off. This is

extremely useful for such things as making a backup of your hard disk to tape during the night, when you are not using the machine – if you happen to have a tape streamer.

Or it can be used to call a dial-up Bulletin Board Service (BBS) in the night and download data while the phones are on cheap rate and there is less likelihood of the telephone lines being busy.

Let's try this out and create a simple task start-up using the Task alarm functions. Get the *Set alarm* dialogue on screen and set the time to be about three minutes ahead of now and click the Task alarm button. Now click in the Message area and type:

Run Resources:\$Apps.!Calc

Finally click on *Save*.

You can view all the current alarms by clicking the *Alarms...*

option on the Alarm iconbar icon, so open this up and you'll see your alarm at the top of the list (probably).

If you can't be bothered to type in the line above you can simply pick up the application you want to run and drag it into the *Set alarm* dialogue. When the alarm activates the !Calc application will be run.

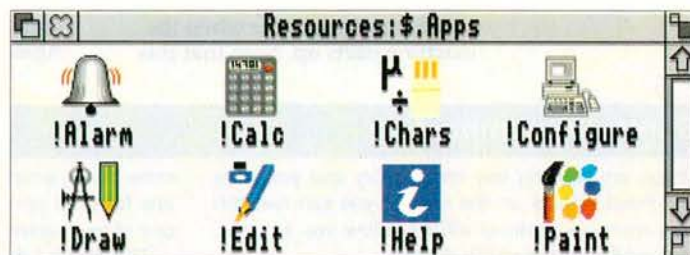
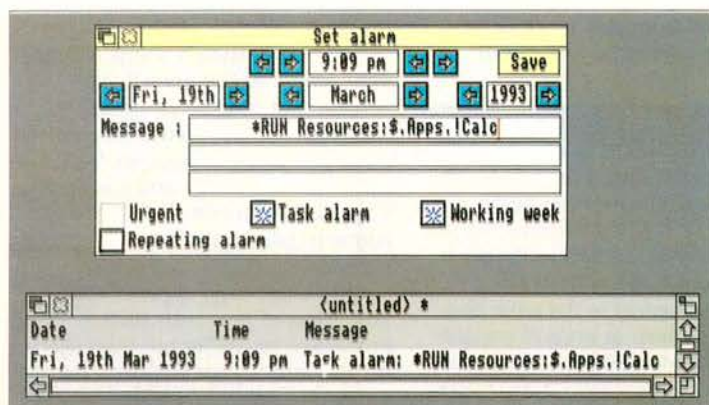
!Calc itself is the same as the Risc OS 2.00 version which is a simple four-function calculator and I have been assured it was simply lack of space that made Acorn put this in instead of a full scientific one – which is supplied on the Apps disks.

Special characters

The next application, !Chars, is also the same as the Risc OS 2.00 version, but doesn't crash when presented with too many fonts. This program is useful for checking

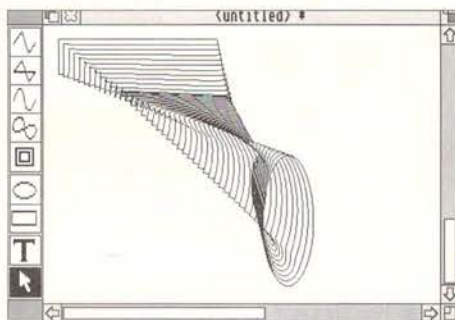


● The filer can give you help on many applications

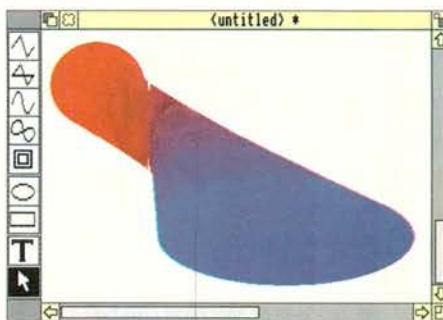


● Alarms can be set up to run applications or initiate many operations

● All the rom-based applications available in Risc OS 3



● The interpolate feature produces shapes between objects...



... while the grade option does it with colour too



● With most bugs fixed Paint is a very versatile freebie

whether a particular font has the special character you require, as it displays the full set on screen.

You can then enter these special characters into your documents by simply clicking on the character you want. Note that these can also be accessed by holding down an Alt key and tapping in a three digit (decimal) number between 0 and 255 on the keypad – the Num lock light has to be on.

Try this for yourself: Open an !Edit window, click in the window, hold down an Alt key and then tap in 1 6 9 on the keypad. A copyright symbol © will appear in the currently highlighted window. This works with all characters but to enter numbers less than 100 you need to precede these with either one or two zeros. So to enter 65, which is a capital A, you need to enter 0 6 5.

Clever !Configure

!Configure is next, and it could really do with an article all of its own. Basically, each individual section of the system can be configured to exactly what you want it to do or how you want it to function. There are sections for disks, floppies, net, printer, mouse, keyboard, memory, sound, screen, fonts, windows and applications.

The most interesting of these is probably the applications section. This allows you to select which applications you want to have appear on the iconbar when the machine starts up. Note that this

only works if you are not using a !Boot file as described in the last month's issue.

!Draw has been extended quite a bit and compared to the Risc OS 2.00 version is now possibly the best package supplied free with any computer system. It has a few new functions as well as all the old commands.

These include a Transform menu option which allows you to alter the size, shape, line width, scale and angle of any selected/grouped objects – including text.

You can now also perform interpolation of two objects. This is easiest to explain by example.

Open a Draw page on screen, select the rectangle drawing tool and draw a rectangle near the top of the page. Now draw a second larger rectangle below the first. Group these together and select the Interpolate option and enter a number like 40 into the box.

This will produce a series of 40 gradually increasing boxes between the small box at the top of the screen and the larger box below it. Even more interesting things can be done if you rotate either box before doing the interpolation.

If you Convert to Path some text and copy it, you can create 3-D versions by interpolating one to the next. Quite a bit of experimentation is necessary to achieve the results you want but it is worth it in the end and the results can be stunning.

The Grade option is similar but will make a smooth transition of colours, say from grey to blue. Again, the bigger the number of

gradients chosen, the smoother the colour transition will be.

The Undo function will be a great boon when you are playing with these new commands. It's a lot easier than trying to select and delete all your newly-created shaped/shades.

Powerful !Edit

Following on from !Draw is the new and more powerful !Edit. The first thing to note about !Edit is that it can now accept and convert Basic programs into text, so there is no need for ARMBE or such Risc OS 2.00 utilities such as !BASICText.

It will take you a little time to get used to using Edit to write/alter your Basic programs, but the advantages over ARMBE far outweigh the disadvantages. To load a Basic program into !Edit you can drag the file icon on to the !Edit icon, drop it in an open window, or Shift+double-click the Basic program icon. When saved, Edit converts the text back to Basic.

If, like me, you have a library of routines to do certain things these can be kept on disk and added together to build up program by simply dragging the required routine into your current new program and they will be inserted at the current cursor position. Another new feature of !Edit is that it can now load any file by simply Shift+double-clicking on it.

The !Help application is similar to the Risc OS 2.00 version and will print the messages from any program that offers help.

And finally there's !Paint. This is very similar to the Risc OS 2.00 version, but only takes up 96k of memory as it is loaded from rom. As far as painting packages go, !Paint is now showing its age and has been surpassed by nearly all the other commercially available software packages on the market today.

It does not even approach the same class of programs such as ProArtisan or Atelier but then again it's free and is a useful utility for viewing or creating a sprite.

Short on memory?

If you are running low on memory and you have the PrintManager on the iconbar you can quit this and most applications will still allow you to print, though Edit is one which doesn't.

Doing this can gain you back over 100k of extra ram – depending on how many printers you have on the iconbar.

Another neat thing to do is to set up the PrintManager with two or three versions of the

same driver, which are configured differently. I have one for draft printing and one for letter quality on one of my machines.

This means I don't have to re-configure the printer driver every time I want a draft or final print.

But as they are both pointing to the same port, you cannot send data to both at once as you will get a Device in use error. However, this is the only limitation I have found.



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New

Maths (Algebra)

For Children 6 to 16 Years

10 out of 10 Mathematics (Algebra) is packed with subjects, levels and activities to challenge all children from Key Stage 1 right up to Key Stage 4.

The graphics are automatically selected to suit the age of the child playing the games but a parent/teacher override allows the games to be customised to meet the child's needs both educationally and for the gameplay. This wide age range coverage means that the product offers excellent value for money and can be used by a family or school for many years.

As with all the titles in the 10 out of 10 series, the six games in the algebra suite have been carefully designed to motivate and reward the children playing. And, in addition to the six mathematical games, there's an extra one supplied FREE.

The free game - WordFit - is based on the popular game in the 10 out of 10 English package. It has been specially adapted to help children to practise spelling words connected with Algebra.

The SIX challenging games cover ALL these Levels of National Curriculum ATTAINMENT TARGET 3 - and MORE!

Graphoid

- 3b.2 Use inverse operations in a simple context
- 4c.2 Work with co-ordinates in the first quadrant
- 5b.4 Use co-ordinates all four quadrants
- 6c.2 Plot simple mappings
- 7b.1 Solve simple inequalities (graphically)
- 8b.2 Locate regions by inequalities

Processor

- 2a.2 Use number patterns up to 10
- 3b.1 Inputs and outputs to simple function machines
- 4a.2 Explore the properties of numbers
- 4b.1 Use simple formulae expressed in words
- 6c.1 Use simple mappings
- 8b.1 Solve a variety of linear and other inequalities

Chain Up

- 2a.3 Distinguish odd and even numbers
- 4a.3 Recognise Mult'n. and Div'n. are inverse opp'n.
- 5b.3 Understand co-ordinates in all four quadrants
- 7b.4 Simultaneous equations - graphical methods
- 8a.4 Interpret graphs of the form $y=mx+c$
- 8c.1 Know the shape of graphs (eg. quadratic & cubic)

Hook It!

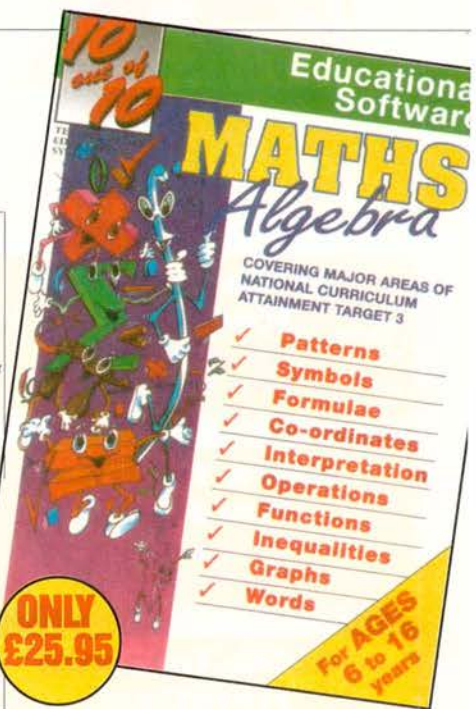
- 2b.1 The use of symbols in place of numbers
- 3a.4 Recognise whole Nos. divisible by 2, 5, or 10
- 4a.1 Recognise terms like square, multiple, and factor
- 5a.3 Understand terms like prime and square root
- 6b.1 Solve linear equations
- 8a.1 Manipulate algebraic equations

Turbo Raft

- 1a.1 Continue repeating patterns in objects
- 3a.2 Explain number patterns
- 5a.1 Add to sequences
- 5a.4 Recognise patterns in equivalent fractions
- 7a.1 Symbols to express the rules of sequences
- 9a.2 Indices for negative and fractional values

Rib Ticker

- 2a.1 Explore simple number patterns
- 4b.2 Use simple equations expressed in words
- 5a.1 Generating sequences/interpreting instructions
- 5b.1 Express simple functions in symbols
- 7b.2 Solve simple inequalities
- 8a.2 Using and rearranging functions



ALSO AVAILABLE - other subjects in the 10 out of 10 Series

Early Essentials

For Children Under 7 Years

Early Essentials is outstanding. All of the activities are not only very enjoyable but they're well thought through. Infant teachers in my school who've seen the package have been most impressed and I feel that it's one of the best multi-purpose infant packages I've seen in a long while. If you have young kids then get it for the home. If you're a teacher, hammer on the headteacher's door and beg for enough money to buy a copy.

- Archimedes World (July '93)



Maths (Number)

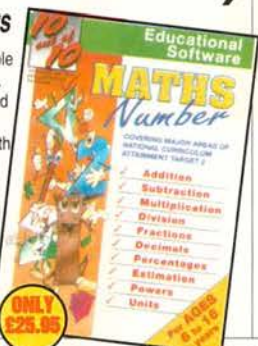
For Children 6 to 16 Years

This is a first rate set of games suitable for a wide range of ages and abilities. They are educationally worthwhile and exciting to play - a rare combination. They are highly recommended for both home and school use

- Archimedes World (Dec. '92).

10 out of 10 is unique in home-based programs because of the National Curriculum link and it makes a good resource for parents as well as good educational fun for children

- The Micro User (Sept. '92)



English

For Children 6 to 16 Years

With its elaborate system of colour-coded levels of achievement and multiple levels of difficulty, 10 out of 10 is a useful compilation of programs based on the current National Curriculum for English... The zappy delivery and range of activities is guaranteed to sustain the attention of even reluctant learners

- RISC User (Jan./Feb. '93)

Most importantly as the games are fun children can't help but learn.

- Acorn Computing (March '93)



The INNOVATIVE 10 out of 10 Series

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Tales with a twist

Computerised storytime – an anathema or an opportunity? Shelley Birchenough turns the pages

PRODUCT SPOTLIGHT

Product: *Naughty Stories*
Price: £9.95 each or £47.95 for all six
Supplier: Sherston Software, Swan Barton, Sherston, Malmesbury, Wiltshire SN16 0LH.
Tel: 0666 840433

THIS could be the answer to many parents' dreams – stories which read themselves to a child. The idea is beautifully simple: A picture with a simple line of text is displayed on the screen and at the touch of a mouse the words are spoken by a digitised voice.

Of course, there is a lot more to it than that. Words can be pointed to and vocalised, some missed out for the child to say and so on, but in essence, here is a series of talking books.

The stories themselves are wonderful and would appeal to the majority of children beginning to read. Sound effects and animation add to the enjoyment too and children are provided with a conventional copy of the book which they can use alongside and away from the computer.

A lot of careful preparation has gone into these stories – they are perfect for equal opportunity and non-discrimination, while from an educational standpoint the vocabulary has been well selected

from the aspect of phonic skills and sight vocabulary.

The stories are designed to appeal to boys and girls alike and contain a good mix of entertainment and moral guidance:

- **Tina's Terrible Trumpet** with the tale of the effect her practising has on the rest of her family
- **Doris the Dotty Dog** who is exactly that but saves the day in the end
- **Billy the Bothersome Bully** who is a reformed character by the end
- **Terry's Tricky Trainers** – every small boy's excuse for getting into mischief
- **Edwina's Energetic Elephant** – expounding on the tale of such a large pet
- **Toby the Tractor** – destructive life on the farm.

All the stories are fully multitasking though you can opt for a full-screen mode if you prefer – and with very small children it is simpler. The sound effects are lovely and the speech is expressive and clear.

To hear these you just click on the ear icon, to see the animation choose the eye icon, while moving through the pages is a matter of following the arrows. It couldn't be simpler for either the child or adult.

Of course you can read the words



– good use of the junior font here – or get the child to read to you, discuss the picture and flick backwards and forwards. Every child, and for that matter adult, I tried it with found something to like. One five-year-old particularly liked the way you could get the individual words to rap like a machine gun.

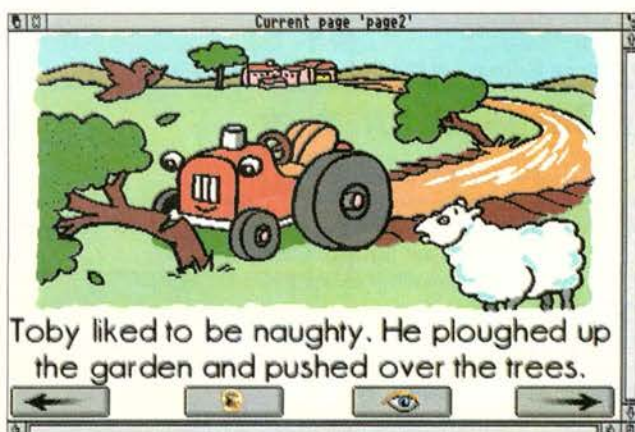
● Accessing the sound and speech is very simple

Summing up

My only reservation is that the simplicity and appeal of the *Naughty Stories* might mean some children finding them a substitute for an adult sharing a book which they never should be.

My own child solved this dilemma by insisting on taking the book to bed for mummy to read to her. But on the positive side I found reluctant readers encouraged to open a book to recapture the computer story.

All children will enjoy this product in a home or school environment. Full marks to Sherston.



● These tales are bound to become classics

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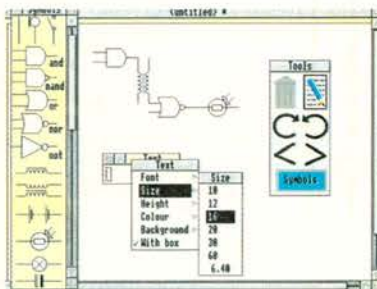
The world's your oyster

Can My World be bettered? Shelley Birchenough investigates

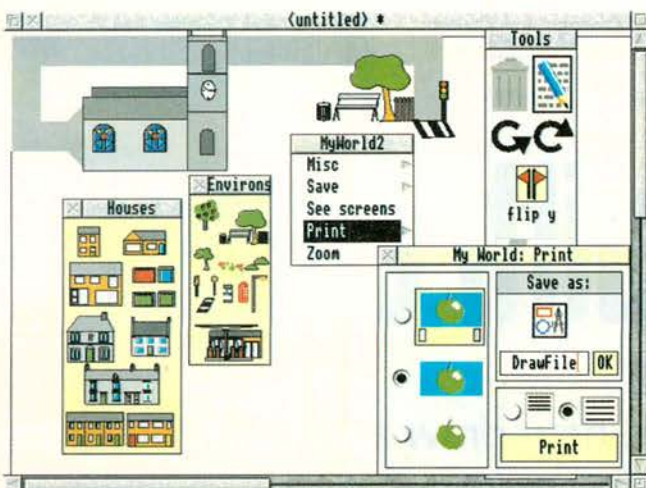
MY World with the various collections of Simple Stuff and subject disks has found a wide following in both school and home. It could be used easily by children in a creative mode – regardless of ability level – and by adults producing their own materials as the whole system was based around !Draw.

So how can you improve on this successful concept of creating pictures using a range of pre-drawn drawfiles? Well My World 2 still allows you to drag elements around a background but now you can enlarge, shrink, rotate, change the colour and even customise the results using Draw options.

Overlay and worksheet ideas complement the package but I feel that there is still a tendency for



● Resizing and colour complement the facilities of the original



● Rotation can be used simply or with the more complex resource packs

PRODUCT SPOTLIGHT

Product: My World 2
Price: £28 (Resources Packs: Awards and Rewards, Kitchen Planner, Dinosaurs, Letters and Numbers, Copy and Match, Computer Aided Design, Face-It. Prices tba)
Supplier: NW Semerc, Fitton Hill CDC, Oldham OL8 2QE.
Tel: 061-627 4469

teachers and parents to use the prepared software with children rather than create their own worksheets and designs, which is a great shame considering the potential of this series.

A very wide range of age and ability is covered by My World 2. A three-year-old coped well with, and immensely enjoyed, creating pictures using Goldilocks to the extent of coming running with cries of *Three Bears!* at the mere sound of the computer being switched on. And dressing Teddy stayed a firm favourite.

My World 2 is not a replacement for the original but if you have been longing for the ability to manipulate objects rather than just move them around this is for you. You can still use the original support disks but you won't be able to access the new features. New

packs are under development aimed specifically at My World 2 and because of the additional features the subject matter is for older ages.

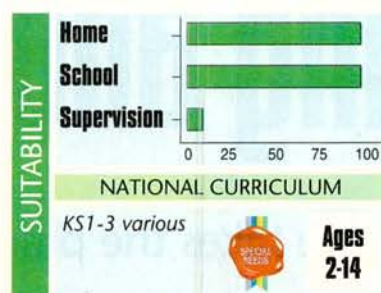
The whole series retains its appeal to those involved with special needs teaching. However, its simplicity of design and ease of use will continue to recommend it to parents with children young and old.

One word of warning: Acquire a printer. Nothing more frustrating than designing a superb picture but not being able to hang it on the wall.

Summing up

For me both packages have a place. I found My World worked best with pre-school and younger children while the added features and facilities of My World 2 were ideal for children who had grown up with the first but now needed something more.

● The world of the *Three Bears* takes on new depth



PRODUCT SPOTLIGHT

Product: *Splash*
 Price: £19.95 (excluding VAT)
 Supplier: Sherston Software, Swan
 Barton, Sherston, Malmesbury,
 Wiltshire SN16 0LH.
 Tel: 0666 840433

SPLASH is an art program for Acorn 32-bit computers with aspects common to both drawing and painting programs. In fact, for a program which is described as *simple* it has a surprising number of sophisticated features.

However, it does have constant interactive help built in so you can find your way around without referring to the manual, but it can be turned off if not needed.

All selections are made from a choice panel which normally appears at the bottom of the screen but can be toggled to the top if more convenient. This also means that you can use the whole screen for your picture.

The software is supplied on two disks, one of which is a protected key disk. So even if you install the program on a hard disk this will still need to be in your floppy drive to load the program.

Once installed on the iconbar the program is partially multitasking. You can return to the desktop to work on another application but while working in Splash you are not working in a Risc OS window.

Clicking on the Splash application icon takes you back to your picture.

Splash has several drawing tools: Line tools, ready-made shapes – including all the regular polygons up to eight sides, circles, ellipses, rectangles and irregular polygons of any number of sides.

Once a shape has been drawn it becomes an object. Therefore, you can move, rotate, rescale and alter its position in relation to other objects, but you can spray paint into it and the painted area also becomes an object which can be edited.

Any object can be selected for further changes and a selection can be grouped for multiple editing. Among the options for changing an object is an interesting one which allows you to round a shape.

For example, you can almost make a rectangle into an ellipse. It is also possible to select an object and have the points which form it displayed. Each point can then be moved individually, allowing you to distort shapes in interesting ways.

The painting tools allow for a variety of brush shapes and colour effects, including spray paint. Once applied to the screen painted areas become objects just as they do when used with the drawing options.

Some of the objects obviously cause the computer to work quite hard when you move them or alter their size. This especially applies to areas of the screen which have been painted rather than created from



● For the more megalomaniacal how about making your own planets?

one of the set shapes. Even so, this is a nice feature and may work more quickly on ARM 3 machines.

Objects can be filled with plain colours or with air brushed fills which can be evenly shaded or feature a range of shading. The colour at each extreme is controlled by scroll bar selection which allows you to mix any combination of 3 of 16 basic colours or 136 dithered patterns – a considerable degree of choice.

Last but not least are the text options which allow you to use any available fonts. As with previous items the text areas can also be treated as objects.

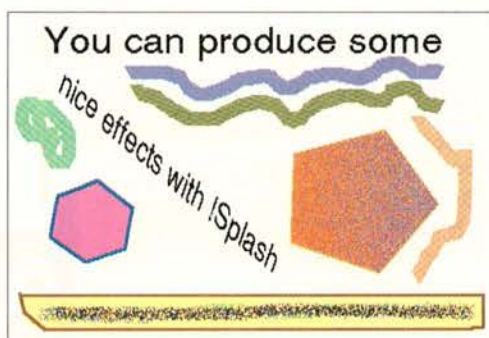
Summing up

This is a quality package but children will need some extended periods to discover its full potential though they can produce something almost immediately.

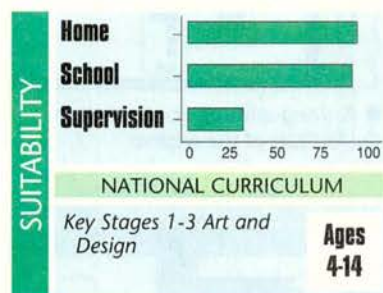
Splash also has a long lifespan – important if you're buying it for home use – as it can be used throughout Key Stages 1 and 2 (Infant and Junior) and into Key Stage 3 (Lower Secondary).



● Create a butterfly to display a splash of colour



● Working with text and paint is very simple

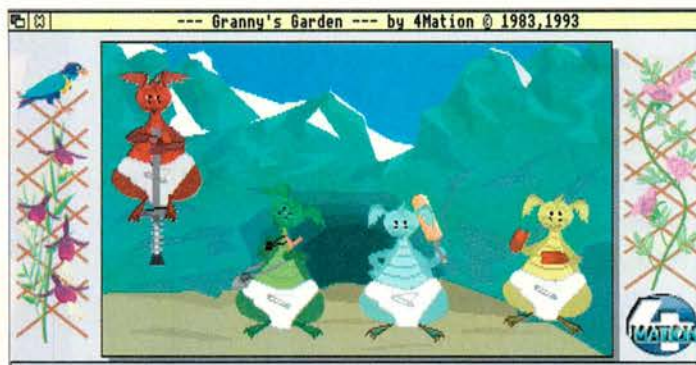


Playing about with colour

John Clemence takes the plunge with a new draw and paint program



● Ten years on and the 8-bit version retains the appeal but the graphics look old



● Now enter the the superb graphics and individual animation of the 32-bit version

Granny power

Chris Drage assesses whether the famous garden has stood the test of time

GOOD ideas are timeless regardless of the medium in which they are couched. Granny's Garden was one very good idea which grew into one of a small handful of *cult* BBC B educational programs. Even Mike Matson, the program's author was taken by surprise by its sweeping popularity.

A decade and 10 various computer versions later, Granny's Garden has finally appeared on the 32-bit Acorn – full circle. The best news is that it's there in its entirety with characters, story line and all. But that's where the similarity ends, for this version is packed with features that could scarcely be dreamt of in 1983.

Granny's Garden is fully Risc OS compliant, operating in a desktop window and in any screen mode. Clicking on !Granny loads the application on to the iconbar and here you can customise your version specifying the font to be used and choosing between a full screen or window version as well as manipulating the memory to speed things up. What is more all your choices can be saved as the defaults.

I am pleased to say that Mike fixed one item that drove most of us crackers in 1983, the program now has full volume control. The adventure is still in three parts except that now it's spread over four disks – testimony to the fact that the program contains far more animation and clever graphics than its predecessor.

For the uninitiated, Part 1 is set in

PRODUCT SPOTLIGHT

Product: *Granny's Garden*
Price: £24.50 (additional Resource pack £15)
Supplier: 4Mation Educational Resources, 14 Castle Park Road, Barnstaple, Devon, EX32 8PA.
Tel: 0271 25353

the Woodcutter's house where participants learn that a wicked witch has imprisoned the King and Queen of the Mountains and hidden their six children.

Exploring the house leads to the discovery of the first child and a password which gains access to the second disk.

This is the pattern throughout the program with successful problem solving leading to discoveries and opening the door to the next scenario.

It may seem a little ordinary in concept today, but in 1983 it really opened teachers' eyes to the fact that cold calculating machines could provide a vehicle for children to explore microworlds and solve problems which, if presented using *chalk and talk*, would prove an instant *turn-off*. Granny's Garden was the archetypal British educational adventure program.

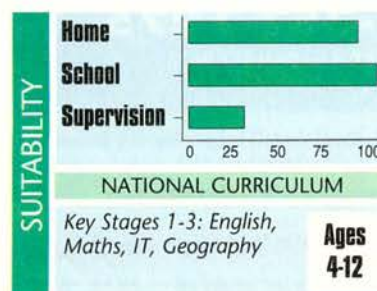
A resource pack is available which contains sets of drawfiles in compressed format and can be used in other applications. Also included are sets of photocopiable activity sheets which provide a focus for the program and follow-up work.

How does the Risc OS version compare to its predecessor? The superb, anti-aliased graphics make the first impact. The reincarnation of each character is a sheer delight – even the blue raven now has a bow tie. What makes them even more appealing is the fact that at any point the screen can be saved as a spritefile to be imported into children's own accounts of their adventure.

The animations are Nootfiles – Noot being another 4Mation products – and are quite superb and very smooth. A clever feature is the ability to run several of the animations at the same time yet independent of each other, their movements not appearing synchronised in any way.

Summing up

The acid test was to see if today's youngsters find the program as entertaining and challenging as those a decade ago. Judging by the reaction of my class of eight-year-olds, the answer is an unequivocal yes.



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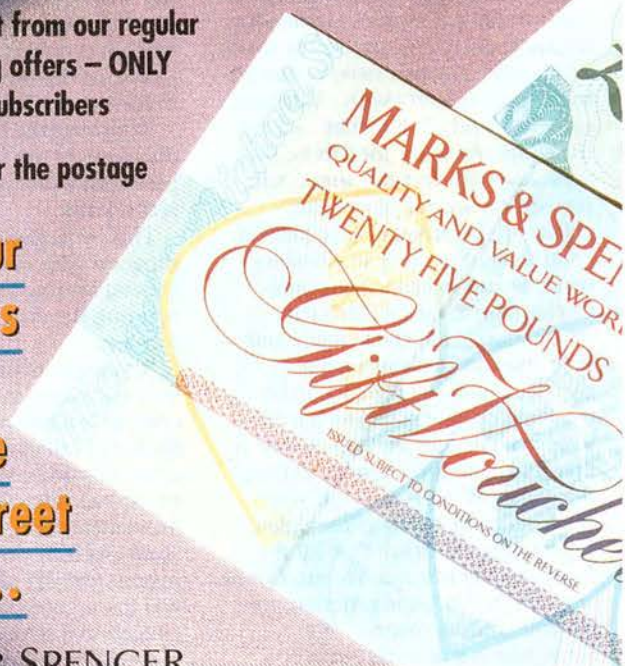
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What a picture!

Rob Miller sticks it in the family CD

WHEN Kodak first announced their plans for PhotoCD, many people scoffed and saw it as a format unlikely to succeed. On closer inspection, the idea of storing high-quality pictures on compact disc is perfectly sound. If it could work with music, why not with pictures?

Like conventional music CDs, PhotoCDs store information in a digital

format that will reproduce exactly as it was when it was first stored. The similarities don't end there either. Remember when music CDs first came out with the promise of perfect sound every time and how scratchy old vinyl would be a thing of the past? PhotoCDs can be used as a direct replacement for traditional negatives and will



● Photo CD technology is aimed at home, business and education



allow perfect prints every time.
Creating your own is simple: Just shoot the photographs as normal on a standard 35mm camera and

take the film along to one of the many PhotoCD bureaux around the country. Most photograph developers will have access to the necessary equipment or will be able to send off your photographs for processing. What you get back is

a gold-coloured compact disc containing the pictures.

The development procedure for PhotoCDs is relatively simple but requires the use of some quite advanced – and expensive – technology.

First, the film is processed to provide standard negatives or slides which are also returned to you along with your PhotoCD. The negatives are then

fed into a scanner and digitised into a machine-readable format.

At this stage, each picture takes up approximately 18Mb of memory – considerably more than conventional electronic still cameras such as the Canon Ion. It's therefore easy to see why the quality of pictures stored on the PhotoCD

What will you need?

Given that you already own an Acorn 32-bit computer, you'll need to add a CD-Rom drive and possibly a SCSI card to connect the drive to the computer. You will also need a special version of the !ChangeFSI application (currently being updated by Acorn) and a new version of CDFS, the CD-Rom filing system.

If you're buying a new CD-Rom drive, make sure that it is multi-session compatible so that you can read PhotoCDs that have had pictures added at different times. At the moment, only a few CD-Rom drives are multi-session compatible and Acorn only list two which they know will work.

medium is so good.

Once digitised, the scanned picture is then fed into a SPARCstation computer which is significantly more powerful than a standard Archimedes and modified using special software. At this stage, pictures can have a number of processes applied to them including automatic density and colour correction. The SPARCstation is also employed to compress the pictures to approximately one quarter of their original size.

Even after compression, the information from a single 35mm picture is far too big to be stored on

● This could be your new family photo album

Acorn's plans for the future

At present, there are two computer systems capable of displaying and processing images stored on PhotoCDs. Both configurations – a 486-based PC or Apple MacIIci – require a lot of free memory both in ram and on a hard disk.

Acorn's proposed setup, using their current 32-bit machines, should allow anyone with a multi-session compatible CD-Rom player to access PhotoCD images from perhaps 1Mb upwards.

At present, Acorn are currently converting software written for the PC and Mac across to the Archimedes platform. The image processing application ChangeFSI is also undergoing a few changes to allow it to convert the PhotoCD pictures into a format recognisable by the Archimedes. CDFS, the filing system that controls CD-Rom players, is being updated to allow them to be connected to the Archimedes to read all formats of PhotoCD.

A definite release date for the software has not been made yet although a spokesperson at Acorn stated that they hoped to be showing something in the third quarter of 1993. This, as you'll probably have guessed, translates to the time of the next big Acorn show, The World of Acorn, at Wembley Conference Centre, October 29-31.

It's plain to see that current Acorn hardware is incapable of reproducing the quality of pictures stored on PhotoCDs both in resolution

and number of colours. Adding a graphics card such as Computer Concepts' Colour Card or State Machine's G8+ to your machine will allow you to get some extra colours but still won't allow the full quality of PhotoCD to be reproduced.

Current developments at ARM Ltd – the makers of ARM3 processors and the new VIDC20 chip – point towards the possibility of Acorn releasing a new machine that is capable of utilising all aspects of PhotoCD to their full advantage. The VIDC20 is similar to the VIDC10 used in current Acorn 32-bit computers, but has the advantage of supporting full 32-bit colour. This would make it an ideal choice for use in such a PhotoCD workstation.

A large amount of memory would be required – even more than the 16Mb currently possible with an A540 – so such a workstation would need to be suitably expandable. All the new computers from other manufacturers, such as Apple and IBM, are capable of being expanded to vast amounts of ram, so it would seem likely for Acorn to follow suit with any new machine.



a conventional floppy disk hence the use of a compact disc. Compact discs are capable of storing approximately 650Mb of data and will hold up to 100 individual pictures when used as PhotoCDs.

The final stage is to transfer the picture information on to an actual compact disc. This is done with a WORM (Write Once Read Many) drive that can write with a high intensity laser beam to special compact discs.

One of the benefits of PhotoCDs is that you can add pictures to a single disc in stages. You might, for example, start off by having a roll of 24 pictures transferred. The next time you take some photographs, rather than starting afresh, you take your existing PhotoCD along to the developers with the roll of film.

The new pictures are then *tagged* on to the pictures already on the disc up to a limit of 100 pictures a disc. This feature also means that you can use particular PhotoCDs for different subjects, making indexing and retrieval of pictures simpler.

Prices for transferring pictures to PhotoCD are approximately £17 for the first set of 24 images which includes the cost of the disc itself. Subsequent transfer on to the same PhotoCD will cost approximately £12 for 24 images.

You may have heard the term *multi-session* recently when referring to a CD-Rom player.

This is the facility to read PhotoCDs that have had pictures added in several stages. If a CD-Rom player is not multi-



● You can't view Photo CDs on Acorn medium yet

session, only the first block of pictures can be accessed.

Standard photographs can be printed off at this stage, up to a maximum size of 11 x 11 inches. Because they are stored at such a high resolution, the colour and sharpness is so close to that achieved from conventional negatives as to be indistinguishable.

What can you store?

Like traditional photographs and film, a number of different formats of picture can be stored. The standard is referred to

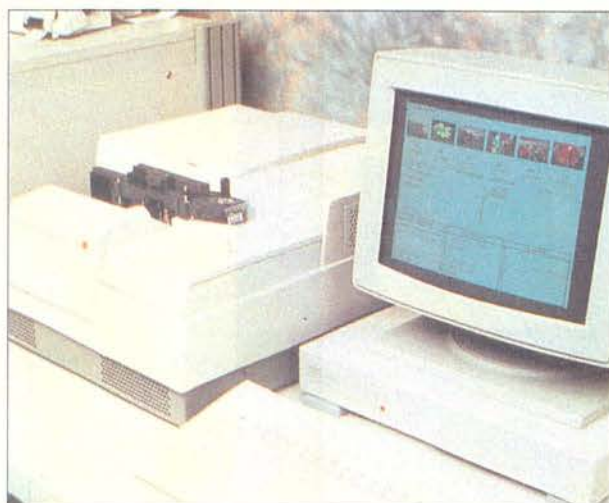
as a PhotoCD Master Disc and is used to store ordinary 35mm images.

The PhotoCD Portfolio disc allows the storage of sound and graphics, in addition to the 35mm images. Such a disc is capable of being used as a multimedia product where pictures and sound can be linked to form some kind of presentation. In addition, pictures on PhotoCD Portfolio format are stored at TV resolution, meaning that up to 800 images can be stored on a single disc.

In addition to the PhotoCD Master and PhotoCD Portfolio disc formats, three formats are aimed at the professional users. The Pro PhotoCD disc can be used to store photographs from

● An example from the Kodak demonstration PhotoCD showing a Mustang in all its glory





● High power scanning technology is needed to create film files

➤ 35mm film, 4 x 5in plate film, as well as larger formats. Special security features can be built into a particular disc to indicate image ownership and copyright and an electronic watermark can be overlaid on to any picture to safeguard further the photographer's work.

The PhotoCD Catalog format is designed to allow *electronic catalogues* to be created from a mixture of pictures, sound, text and graphics. Up to 6,000 video-resolution images can be stored and split into any number of groups.

Finally, the PhotoCD Medical format has been specifically designed to provide a medium for storing computed tomography (CT) scans and magnetic resonance images (MR) as well as film-based

● Note the wood grain and the luminosity of this picture



Multimedia Expansion Unit

The Sony CDU461 and CDU561 will both function perfectly well and the CDU561, supplied by Cumana, is incorporated into Acorn's Multimedia Expansion Unit – MEU for short.

The MEU comes as an A4000 look-alike box designed to sit alongside your computer – on top if you have an A5000. As well as housing the CD-Rom drive, it has additional space for two additional SCSI drives for hard disks or magneto-optical drives and so on plus a built-in mixer to combine the sound from a CD-Rom/PhotoCD with that from the computer. An optional amplifier can be fitted inside the MEU's box

to drive normal hi-fi speakers directly.

Although it uses the SCSI standard, the MEU does not actually come with an SCSI interface. This will have to be bought separately and will cost anything between £50 – for Atomwide's recently announced SCSI *dongle*, from £110 from Cumana and £200 for Morley's 16-bit cached SCSI podule. Prices vary depending on the speed at which the various cards perform, but all should work with the CD-Rom drive.

At £499, the Acorn MEU is not cheap, but it does provide an all-in-one solution, plus it has the ability for considerable expansion.

images. Medical records of this nature invariably take up a lot of physical room and the ability to store them on a relatively small medium is a distinct advantage over the current system.

The future?

Although the concept of PhotoCD is relatively new, Kodak already have many plans for increasing and enhancing the use of PhotoCD technology in both the home and professional markets. The recent licensing deal between Kodak and Acorn should help Kodak to make further inroads, while increasing the credibility of Acorn's products in the professional/business world.

The Kodak Picture Exchange is an ambitious project to provide a

massive, online picture library, available to anyone with a modem. Users of the system will phone up a computer and use key words to search for the desired picture. Low-resolution *thumb-nail* images will then be downloaded so that you can check that you're getting what you want.

Once you've made a choice, the computer will automatically alert the necessary image supplier and the relevant prints, negatives or transparencies will be sent out within minutes. This system will be available in the USA by the middle of this year but should soon catch on over here.

As mentioned before, the software to allow Acorn machines to read PhotoCDs will be available some time in the autumn and a full review will appear soon in *Acorn Computing*.

Until then, you'll just have to make do with the pictures in this article.

Multi Session compatible CD-Rom drives

This table gives a list of other drives that are multi-session compatible, but these still require the necessary drivers to allow them to work with Acorn's code.

Model	Int/Ext
Mitsumi CRMC LU005s	I
Gen STAR 5000i	I
Sony CDU 31A	I
Toshiba TXM 3301BSP	I
Toshiba TXM 3301E1P	I
Phillips CDD 462	E
Toshiba TXM3401E1P1000	I/E
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QD Bug £69.00

"...a must for assembler programmers, and comes very highly recommended" Archimedes World May 1993. (overall rating 95%)

QD Bug is the definitive debugger for all ARM coders both beginner and expert. It has many powerful features including: single stepping, skip and force instructions, SWI history lists and trapping, customised flexible windowing system, view BASIC sources and text files from within the program, keypress emulation with macro record and playback.

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A GOLD ring and a spindle make up the current loot as we attempt to thwart the Seven Deadly Fins in the Magnetic Scrolls adventure *Fish!* which provides a lot of laughs and a fair number of headaches as well.

Back in the castle, you are now faced with no choices whatever: It's the jagged warp, like it or lump it.

So, off you go – finding yourself in the back of a van, feeling cold, gazing at a blanket and a pair of jeans. Wear the jeans and get out of the van.

The command **OUT** actually takes you into the cab of the van – the clues provided show that the van belongs to a band and that their roadie is called Steve. He is a litter-lout, so search the rubbish in the cab. Help yourself to the torch you find, then read the note to discover that Steve has gone for some diesel.

The location description told us that the passenger door was open, so venture out into the darkness and light the torch. Head eastwards towards the fire and the sound of music until you are outside the ruined Abbey. Read the poster if you want to and then head east again into the Abbey. Ignore the hippies and go

The

UIM postbag

The game UIM provokes occasional interest due to its similarity to *Elite* and here's a query from William Turner: How can he complete the mission on the sixth network?

It says that you have to go to Ell-nar and then to Anteate. However, you need an ocean drive to get to Ell-nar and another to get to Anteate and you can't get one at Ell-nar or buy two at one time. What's the answer?

south into the nave where you'll find a broken pew. Take the pew and – at the same time – switch the torch off since you'll find that the fire gives enough light to see by as you move north twice into the transept. You'll need the pew later, but not for parking your behind on – drop it here in the transept.

Switch the torch back on again and head down into the antechamber. Next move is south, towards the catacombs. You will now be interrogated: Are you serious about this catacombs business? Of course you are: Be bold, be strong. Well, enter **YES** anyway.

It was rubbish in the cab, it's

Magikal Mistery Tours

I'm going to spend a little time this month dealing with a feature of *The Price of Magik* which doesn't make itself readily apparent – though it can be stumbled on fairly early in the game, given the right circumstances.

Many Level 9 adventures contained some sort of teleportation facility enabling the player to move from one area of the game to another economically. This proves of greatest value once the game has been fully explored, because it is then possible to solve it in the most efficient way.

In fact my advice to beginners in adventuring is always to conduct as thorough an exploration as possible, noting puzzles on the way – but not necessarily solving them immediately – in order to formulate an overall strategy, as you uncover the twists and turns the game writer has put in as a way of keeping us guessing right up to the last moment.

So, let me introduce you to *The Mists of Time*, which is what the teleport facility is called in *The Price of Magik*. You need to have learned the ZEN spell by finding the parchment which is on the desk in the study adjoining the library. Because of my own devious approach, the study was location 91 on my own map – just over halfway through my explorations.

However, again due to my devious approach, I had already obtained the focus for the ZEN spell: It is the little mirror obtained by cutting the mirror covering the south wall of the east attic with the diamond ring – location nine in my map. A couple of dozen locations are accessible via the Mists of

Time and, if I list them, it may well help anyone who has got a bit stuck to start exploring again – always supposing you have the diamond ring, the little mirror and the parchment.

The locations are (in no particular order) the north tower, entrance hall, anti-alcove, morgue, rock outcrop, standing stone, cold store, stone archway, winding drive, misty room, temple, herb garden, triangular room, river bed, dry gallery, portico, store room, pantry, grotto, hall of statues, winding corridor, ominous chamber, stone archway and the grassy plain.

If some of those are foreign to you, you now know what to do. It won't necessarily help you to solve problems, but that's another story.

I have already hinted that I shall not be providing a fully detailed solution to this adventure. What I have done thus far should provide anybody who got stuck, with what I see as the proper way to tackle the game – specially now that I have introduced the teleport facility.

Next time I shall give details of all the spells – particularly where the focus of each can be found – plus some general hints, together with the solution to the problem of how to open the door in the stone room. This is the problem that bars the way to the final confrontation with the evil Myglar.

● To be concluded.

Abbey's Abyss

debris in the catacombs: Get searching. You'll uncover a sarcophagus lid, so get moving: Moving the lid will reveal an exciting exit leading down. I dunno about you but my little heart's going pit-a-pat.

On entering the altar room you have a vision of a girl in white, a raised dagger – and you get the psychic collywobbles. Exciting, innit? You should now examine the altar. Ignore the custard stains but grab the cord, pronto – otherwise you are doomed, doomed, I tell you.

Now go back up to the catacombs, north to the antechamber and then up to the Transept. If you try to get onto the pew you will be told that, though it's a bit wobbly, you could reach the arch from there – and that's the next destination.

Once up, you see a gargoyle. You need it, but it's not subject to the usual *GET/TAKE* routine – if you try that, you'll be told that the archway is in danger of collapsing.

Instead, tie the ceremonial cord to the gargoyle and climb back down, giving the cord a hefty pull. The good news is that the gargoyle now lies at your feet: The bad news is that the noise of the archway collapsing drew the attention of the drink-maddened hippies to your presence and they are staring in your direction.

Grab that gargoyle, head down to the antechamber and south to the catacombs. You can use the lid of the sarcophagus to block the doorway, allowing you precious extra moments to get down to the altar room.

Remember the custard? Well, the hole used to contain a gargoyle, so untie the cord from the gargoyle and stuff it (not the cord, silly) into the hole. The altar will disappear, to be replaced by a column which descends from the ceiling.

Examining the column produces the information that, in a niche, it contains a chalice – and naturally you are meant to take it. Inside the chalice is a grommet: Grab it to ensure a successful finish to this part of the adventure.

Sir Playfair will now brief you as to the next aspect of your mission.

Those nasty Fins are trying to evaporate the water from the fish planet and you are now to be teleported into the body of the leader of the fish planet's scientists,

Dr. Roach. Sir Playfair has also opened a warp to the planet's capital, Hydropolis – and there we'll leave matters for now.

● *To be continued.*



Elite affairs

Ploughing through my mailbag, I came across mutters and queries from Daniel Oram concerning ArcElite. Main mutter was about the Docking Computer – which provides neither the instant docking that some versions of Elite did, nor infallible docking if you engage it the moment you enter the Safe zone and wander off to make a cuppa.

This was deliberate: It really is computer assisted docking and you must line up reasonably on the letter box of the Space Station first. Once you have Yaw Boosters things get easier. Daniel put his programming ability to work and, when I have time, I'll do a spot of evaluating and let you know what happens if you add his tweaks to your program.

Daniel has a query about formation flying: He doesn't see much at present. It's certainly there, particularly with Zartid's bodyguards – and I don't think that's just because I have the Gold Edition, though I do most strongly recommend an upgrade to this.

I can confirm that no cloaking device is available on ArcElite and, finally, Daniel asks about *anti-lock missiles* I think he must mean *auto-lock*. This device is useful in keeping track of which ship is targeted while you are engaged in a general melee.

Believe me, when you are jumped by anything up to a dozen pirates, life can get a little hectic and you may not have time to fire the missile or to reset it if you accidentally blast the targeted ship.

Commander DQ has sent speculation and a slap on the wrist for me: He complains that ArcElite isn't totally faithful to the original on account of the extra combat rating Very Deadly. OK, so I didn't know that when I wrote about it first.

Here's the speculation-cum-detective work concerning the (missing) Ninth Galaxy and a possible mission. First, he noted that everything that has been in the other missions is featured in the manual right down to the fact that

even Rantan Pino gets a mention as a *Gravel tanker later to become a pirate*.

Searching the manual turned up the following items not remotely involved in any mission: Galaxy 9, the Tri-alliance, the Ophidian generation ship and Space dredgers.

Doing some hacking provided the following scenario: Possibly while in Santaari and when you are Elite, the Tri-alliance contacts you to destroy the Ophidian generation ship in the very unstable ninth galaxy. You are given a special intergalactic drive and, since the area around the generation ship is a potential war zone, space dredgers will be encountered. Interesting.

He has a couple of queries: He has noticed that screenshots on the back cover of the box show figures following the Legal status and the Combat rating but these don't appear in the game. He is correct – the prototype version had this feature showing the number of kills and offences, and the screenshot was from the prototype version of ArcElite.

He also refers to the tip given elsewhere for reaching Witch Space in ArcElite: Set a hyperspace destination, pause game, press F, unpause and off you go. That's a load of baloney: You can't get back to desktop while the hyperspace countdown is running, and if you do this routine in any other situation you get the normal hyperspace effect. I know, I've tried.

His final query was to ask what is this special thing about escape capsules. Dunno, mate: I've got one but rarely use it – they are expensive to replace and my middle name is Scrooge.

Regarding Witch Space, I have a hard time of it on the occasions that hyperspace fails and I emerge there, and I'm glad to get out pretty quickly. How about you? Practical comments appreciated, not unverifiable boasting.

If you want to die quickly while in flight and return to a previously saved position just press E continuously – it takes about five seconds.

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OVER 500 FONTS

SO, you have an A3000 and you want a joystick port but haven't managed to get enough spare cash to buy one yet? Well we have the answer: The ACJoystick interface – a do-it-yourself project that replaces the serial upgrade.

Let's start with the software which is simply a module that all modern games call via the SWI (Software Interrupt) *Joystick_Read*. It's called with register zero (r0) containing a 0 or a 1 to tell our module which joystick it wants information about. The panel shows the official Acorn specification of the SWI.

Let's explore what our software has to do to make sure that the game gets back what it expects when it calls our version of the Joystick SWI.

We know that the calling game will give us a number for the joystick and expect a result to be returned in r0. We are only interested in what Acorn call single-switch joysticks and what we all know as Atari-style ones. We have to return a 32-bit word in r0 with the relevant bits set.

For byte zero we have to return &40 for up, &C0 for down and &00

for the rest position. Likewise for left and right but this appears in byte one so left is &C000, right is &4000 and rest position is &0000.

Byte two corresponds to the fire button and so the value to return will be &010000 when the fire button is pressed. Finally byte three is reserved, we must return &00000000 in that one.

So that we can go diagonally, we must be able to return values such as left and down at the same time. This is achieved by ORing the results of the each test together to get the final 32-bit word for r0 which we return to the game.

Ok, this gives us something to work with now – we know what we get when the game calls us and we know what we have to give back when we return.

The hardware

Now we need to look at the hardware as shown in the diagram. We can see from this that the byte of information we will get when we read the hardware chip – a 74HC245 tri-state buffer chip – is wired up so

that bit 0 is connected to the left button on the joystick and its position in the byte is bit 0 (00000001).

Next, is the down button and it appears in bit 1 (00000010). The fire button is next and appears in bit 2 (00000100), the right button appears in bit 3 (00001000) and finally the up is in bit 4 (00010000).

In an ideal world, if we were to hold the joystick in the down/right position we would get back a byte with:

Down	00000010	(decimal 2)
+Right	00001000	(decimal 8)
	00001010	(decimal 10)

However, nothing is ever that easy, all joysticks change the signal to 0 volts (a binary 0) when switched, and not 5 volts (a binary 1). So what we would really get is:

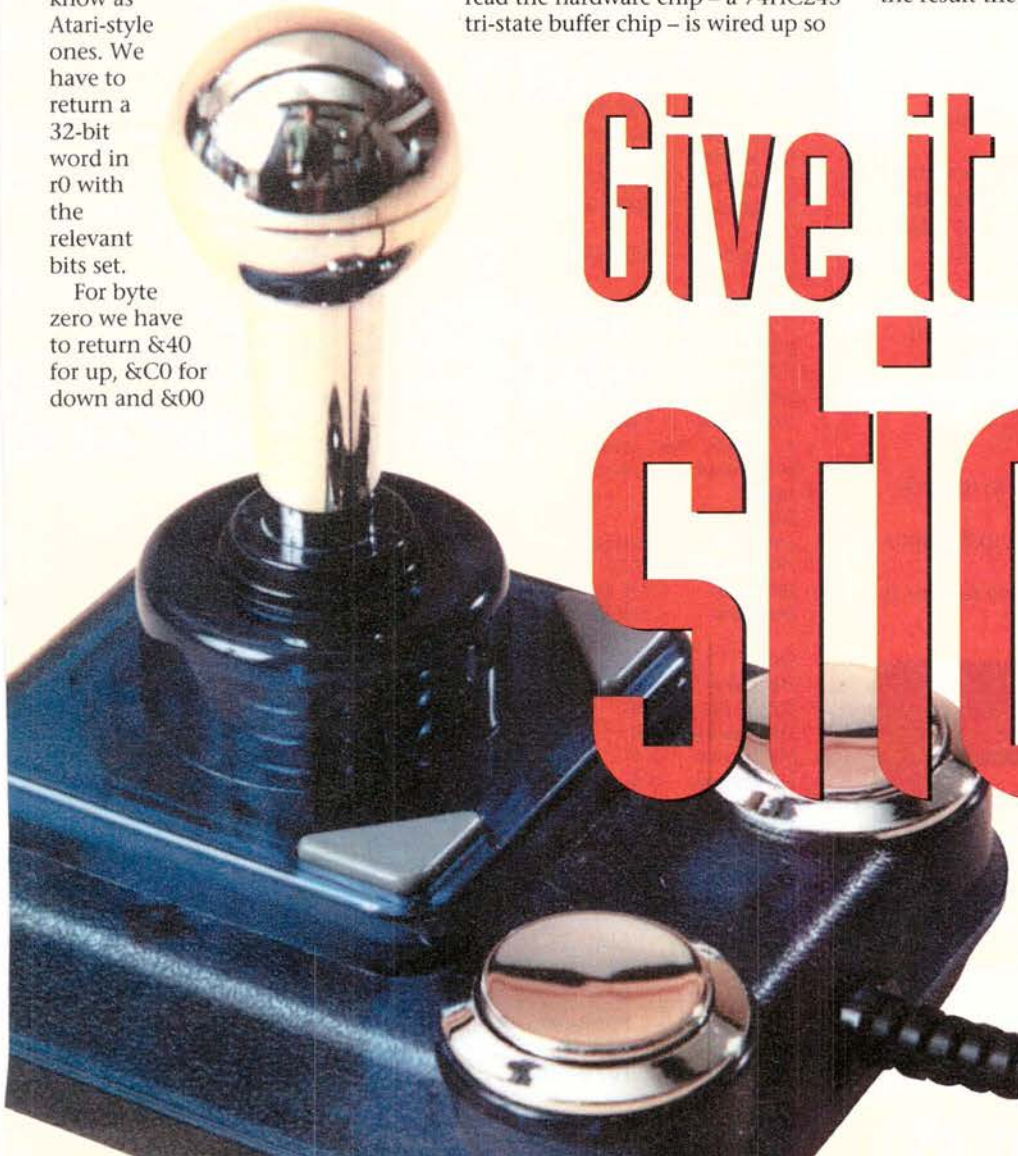
Down	00011101	(decimal 29)
+Right	00010111	(decimal 23)
	00010101	(decimal 21)

This makes doing straight maths on the result the hardware gives to us



Give it some stick!

David Reid shows how to add a joystick interface to your A3000



very difficult for mere humans to understand.

But the ARM chip has a special command for dealing with this kind of problem. The TST command will AND a value we supply with the byte read and set the zero flag which we can test in the instruction that follows.

Using this it's easy to convert the strange joystick output into what we want it to be.

Creating the source

The listing is the source code for our joystick module. If you have Risc OS 3 you can use Edit to type in the program, use the iconbar menu Create=>Basic and save it as ACJoySrc.

With Risc OS 2 you'll have to go into Basic and type in each line with a line number in front of it - use the AUTO command to generate these automatically.

When run, the program should create a relocatable module called ACJoystick in the default directory on your disk. To make the module into a nifty application, follow these simple steps:

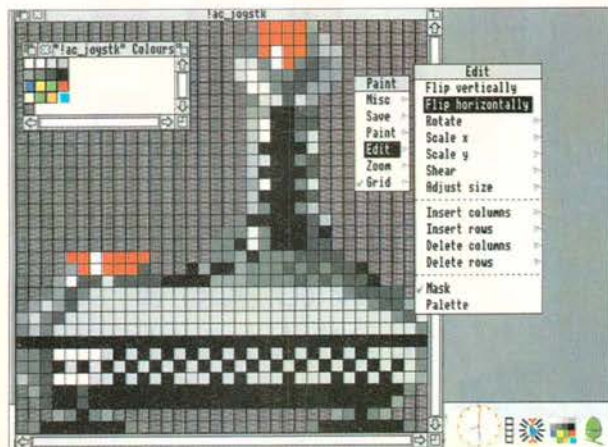
- Create a new directory called ACJoystk.
- Make the sprite as per the sprite diagram. It's 34 pixels wide and 17 pixels high in Mode 12. Call it !acjoystk and save it in a file called !Sprites in the new directory
- Create an Obey file in Edit and type following lines into it:

```
IconSprites !Sprites
RMLoad .ACJoystick
```

and save this as !Run in the new directory

- Drag the ACJoystick module into the new directory
- Close the directory and rename it to !ACJoystk.

● Use !Paint to create your joystick sprite



Hey Presto, it's done, an instant application.

You should really keep the source file, in case you want to make another module in the future, but don't put this in the application as it is not required there. You might want to make a new directory for yourself called Sources and keep it in there for future use.

To load the software module all you have to do is double-click on !ACJoystk to load the module. Now on to the hardware construction.

Building it

The hardware for this project is minimal and very simple to explain. Each of the different switches in the switched joystick are mapped, via a tri-state buffer, on to

a memory location in the A3000 memory map.

When we access this memory location, a line on the chip called Chip Select (CS) turns on the gates in the chip and any signals on the input are presented to the computer data bus from the chip outputs. Each direction/button has a designated data bit in this byte and this is then read and interpreted by the software module.

So, let's look at the the inside of the A3000. If, like me, all the normal expansion routes available are full, the only space not taken will be the serial chip upgrade sockets which is where this upgrade fits.

It also has the convenience of being attached to a 9-pin D-type plug on the back of the machine.

```
10 REM ACJoystick Interface Source
20 REM by Owen Smith & David A. Reid
30 REM (c) D.R. Computer Products
40 swi_up = &00000040
50 swi_down = &000000C0
60 swi_left = &0000C000
70 swi_right = &00004000
80 swi_fire = &00010000
90
100 hw_left = %00000001
110 hw_down = %00000010
120 hw_fire = %00000100
130 hw_right = %00001000
140 hw_up = %00010000
150
160 hardware = &03380000
170
180 V_flag% = 1<28
190
200 swi_head$ = "Joystick"
210 switail0$ = "Read"
220
230 badswi$ = "SWI value out of range for module "+swi_head$
240 toobig$ = "Joystick number out of range"
250
260 file$ = "ACJoystick"
270 version$ = "2.01"
280 date$ = "17 Apr 1993"
290 type$ = "A3000 Internal-Serial"
300
310 start = 0
320 initialise = 0
330 finalise = 0
340 service = 0
350 commands = 0
360 swi_chunk = &43F40
370 swi_decode = 0
380
390 DIM code% &200
400 FOR pass% = 4 TO 7
410 PX = 0: OX = code%
420 [OPT pass%
430 .begin
440     equd start
450     equd initialise_code
460     equd finalise
470     equd service
480     equd title
490     equd help
500     equd commands
510     equd swi_chunk
520     equd swi_entry
530     equd swi_names
540     equd swi_decode
550
560 .help
570     equd swi_head$+CHRS(9)+version$+" ("date$+" "+type$
580     equd 0
590     align
600
610 .swi_names
620 .title
630     equd swi_head$+CHRS(0)
640     equd switail0$+CHRS(0)
650     equd 0
660     align
670
680 .error_bad_swi
690     equd &110
700     equd badswi$
710     equd 0
720     align
730
740 .error_bad_joystick
750     equd &43F41
760     equd toobig$
770     equd 0
780     align
790
800 .swi_entry
810     teq r11, #0
820     ; bad swi check code
830     adrne r0, error_bad_swi
840     orrne r15, r14, #V_flag%
850     bics r11, r0, #1
860     ; bad joystick check code
870     adrne r0, error_bad_joystick
880     orrne r15, r14, #V_flag%
890     ldr r11, serial_address
900     ; load the byte from hardware
910     ldrb r11, [r11]
920     mov r0, #0
```

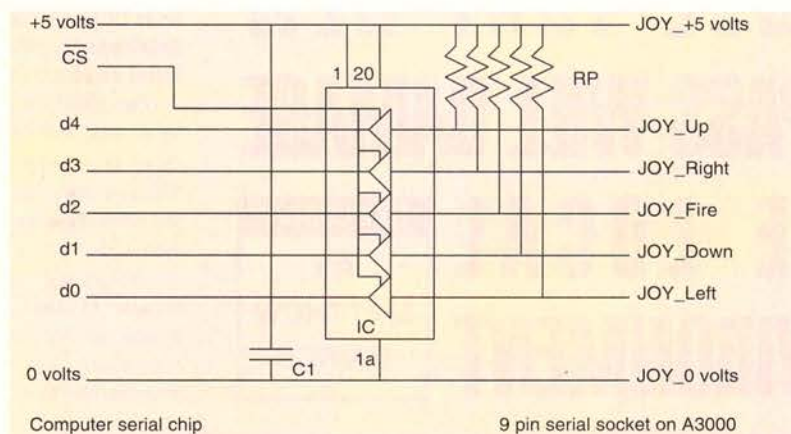

This makes for a very low-cost but effective upgrade.

Building the hardware PCB should not present anyone with any problems, so a kit is available from D. R. Computer Products whose address you can find in the panel at the bottom of this page.

If you can't solder, the board can be supplied built and tested at a slightly higher cost. For those of you with access to your own components, the bare PCB can be supplied with full instructions on assembly.

The completed board simply plugs into the empty 6551 and LT1133 (serial) sockets on your A3000.

Full diagrammatical and physical drawings are supplied with the AC Joystick kit and the AC Joystick bare



● Only a very simple circuit is needed to connect the joystick to the A3000

PCB versions. In all, it should take no longer than 15 to 20 minutes to build and test.

The kit version comes with

another Basic program for testing the board you have built, thus giving you confidence in your soldering ability.



```
; test the bits and make r0
930   tst    r11, #hw_right
940   orreq  r0, r0, #swi_right
950   tst    r11, #hw_down
960   orreq  r0, r0, #swi_down
970   tst    r11, #hw_fire
980   orreq  r0, r0, #swi_fire
990   tst    r11, #hw_left
1000  orreq  r0, r0, #swi_left
1010  tst    r11, #hw_up
1020  orreq  r0, r0, #swi_up
1030
1040  bics   r15, r14, #V_flag%
; and exit with no error.
1050
1060 .initialise_code
1070   stmf   r13!, {r14}
1080   adr    r0, installed
1090   swi     "XOS_Write0"
1100   swi     "XOS_NewLine"
1110   movvc   r0, #7
1120   swi     "XOS_WriteC"
1130   ldmf   r13!, {r15}
1140
1150 .installed equ type$+" Joystick
Module installed"+CHR$(0)
1160   align
1170 .copyright equ "D.R.Computer Pro
ducts ' 1993 - coding by Owen Smith and
David Reid"+CHR$(0)
1180   align
1190 .address1 equ "5 Bridge Court,
Bridge Road"+CHR$(0)
1200   align
1210 .address2 equ "Chertsey, SURREY
, KT16 8LX"+CHR$(0)
1220   align
1230 .address3 equ "Tel: 0932 566435
"+CHR$(0)
1240   align
1250
1260 .serial_address
1270   equ    hardware
1280 .codeend
1290 ]:NEXT pass%
1300
1310 OSCLI("SAVE "+file$+" "+STR$(code%
)+" "+STR$(codeend-begin))
1320 OSCLI("Settype "+file$+" Module")
1330 END
```

SWI Interface for joystick devices

The joystick module provides a SWI interface for reading the state of a joystick. When the module initialises it tests for the existence of built-in joystick hardware and if it does not find any then it will not initialise.

Third parties can replace this module to provide different hardware. It is recommended that any such modules have version numbers greater than 2.00 so that Acorn can upgrade its own module without preventing its replacement.

Joystick_Read (SWI &43F40)

Returns the state of a joystick.

On entry: R0 = joystick number (0 or 1)

On exit: R0 = joystick state

Interrupts: Interrupt status is not altered

Processor mode: Processor is in SVC mode

Re-entrancy:

Use:

Byte 0:

Byte 1:

Byte 2:

Byte 3:

Not defined

This SWI is used to obtain the state of the requested joystick. The state is returned in the following format:

Signed Y value (range -127 to 127) -64, 0 or 64 for single-switch joystick (corresponds to Down, Rest, Up).

Signed X value (range -127 to 127) -64, 0 or 64 for single switch joystick (corresponds to Left, Rest, Right).

Switches (eg. fire buttons) starting in bit 0, unimplemented switches return 0.

Reserved.

ORDER FORM

If you would like an ACJoystick for your A3000:

☐ AC Joystick Kit

Printed circuit board, all components, a circuit diagram, the software listing, test software listing and full instructions on assembly, installation and use.....£9.95

☐ AC Joystick built and tested

Fully built and tested version of the kit.....£12.95

☐ AC Joystick PCB only

Printed circuit board, circuit diagram, the software listing and full instructions for assembly, installation and use.....£5.95

All prices include postage and packing. Please make cheques payable to D. R. Computer Products and send to: ACJoystick Interface Offer, D. R. Computer Products, 5 Bridge Court, Bridge Road, Chertsey, Surrey KT16 8LX. Tel: (0932) 566435.

Name _____

Address _____

Postcode _____

Note: This upgrade replaces the Serial Upgrade on an A3000.Econet version for A300/A400/A5000 users

day present
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ar-old musician
 audition to star
naestro when he
tour at the
Theatre next



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Last week the Express
reported on the complaints of

management of Eugeley
branch was not aware of

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make the views of the

The cage in the
aluminium cans are stored v

SCHOOL CHILDREN PROVE THAT NEW BYPASS WILL DAMAGE THE LOCAL ENVIRONMENT

EXCLUSIVE

BY
MATTHEW
DAVIES

USING an innovative new program on their classroom computer children from St. Chad's School have shown town planners that a proposed new bypass would have a detrimental effect on their local environment.

The children surveyed the local area and fed details into their Topographer program, which allows them to look at the relevant area in 3D. They then added the new road along its proposed route and it became obvious that the road would not only affect an area renowned for its badger population but would also

distract children in classroom as they would be able to see traffic moving along the new road.

The children even went far as to propose a new route for the road to the town planners. The proposed route would have a negligible impact on the area but would provide the much needed route to existing roads.



A SERIES of sweeping proposals which would abolish free parking in district shopping centres, change some bin collections, increase lettings charges and scale down mileage claims by some council officers, have been announced by Labour.

In the first indication of their intentions since seizing power jointly with the Conservative party has produced a list of 1,000 services.

● REDUCING maintenance

Other economic departmental budget cuts cutting school fees.

Tr

Topographer is a major application for the Geography curriculum which allows children (and teachers) to have lots of fun whilst learning all about maps, contour lines, valleys, rivers etc. In fact *Topographer* covers virtually all items found on a map.

The real breakthrough with *Topographer* is its 3D section which allows you to convert a 2D map into a 3D model on screen. Imagine turning a set of flat contour lines on a 2D map into a 3D model which clearly shows the hill — no more cardboard cut out models or papier mache! You define where you look from, and what you look at.

Topographer also covers aspects of the IT and maths curriculum with its modelling capabilities. Just stop for a minute and think of the projects that you could do with *Topographer*. You could make

a map of the local area with churches, pubs, woods etc. and then view it from various places. If there is a bypass proposed you could add it in to the existing landscape and see where it is visible from and what impact it is likely to have on the community. I'm sure you can think of a hundred and one topics.

◆ Fully RISC OS 2 & 3 Compliant and 1 megabyte friendly ◆ Suitable for all ages from 6 onwards ◆ Easy and quick entry of all symbols (over 100) ◆ Wooded areas which translate into impressive 3D landscapes ◆ Definable map size and scale which can be linked to the national grid references ◆ Powerful 3D mode

giving a true representation of the landscape ◆ Stunning 3D models which can be saved as a sprite file for use with other applications.

£79.95 inc. VAT

All specifications subject to alteration without notice

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We accept Access and Visa.

PRODUCT SPOTLIGHT

Product: ShareHolder Professional 3
Price: £195 (inc VAT)
Supplier: Silicon Vision Ltd, Signal House, Lyon Road, Harrow, Middlesex, HA1 2AG.
Tel: 081-861 2173

D ID you buy Telecom or the other privatisation shares? Do you run a phantom portfolio to see whether you could make money with the real thing? Whatever your involvement with stocks and shares, you quickly discover that the dealers and brokers hold most of the cards – they set the prices and the differentials between what you can buy at and what you can sell for.

You take the risk and they take the commission. But you hold two aces: You decide when to buy and you decide when to sell. Choose right and you can shrug off the broker's charges and make the proverbial killing. Choose wrong and your fingers get burned. In the ups and downs of the stock market only one thing is certain – if you don't keep track of your shares' performance you have no hope of identifying good opportunities to deal.

For years I have charted the movements of my modest portfolio by diligently checking prices in the newspaper and entering them in a spreadsheet. If I'm keen enough, I can make the software display graphs of the weekly fluctuations. The snag is this: Who wants to spend half an hour a week entering figures which you mostly never act on?

Enter Shareholder Professional 3.

This is a Risc OS-compliant, relational database management tool adapted for recording and displaying share information. The package is pleasingly intuitive to use and scores strongly on relational features.

But crucially, it can extract share prices from Teletext and Prestel files as well as from text files. You thus have three possible modes of operation: You can manually enter prices from the newspaper, you can download a teletext file of share prices, or you can download a Prestel file.

Manual updating is a tedious

business, as I have already remarked. Both the downloading options spare all that looking up and typing. Prestel carries detailed information on a wide range of quoted shares, but it's not cheap. You have to subscribe to access the pages and you have to pay for the phone call. Teletext, on the other hand, carries a more limited range of 300 or so of the most widely traded shares, but if you have a teletext adapter fitted to your Arc, the only expense is a TV licence.

The way it works is disarmingly simple. You grab a file from your

Value your shares

Clem Vogler investigates a software package that takes the pain out of updating your portfolio

The background image is a large, detailed financial table, likely a stock market listing. It contains numerous columns of data, including company names, stock prices, and other financial metrics. The table is organized into sections, with some headings like 'PAPERS & PUBLISH' and 'INSURANCE' visible. The text is small and dense, typical of a financial newspaper or magazine listing.



Clem Vogler has taught physics, electronics and computing at a number of schools and colleges.

His industry pedigree comes from working as a standards physicist for Marconi and as test engineer working on spectrum analysers and scanning electron microscopes.

ADFS::HardDisc4.5.Shares

Info

Page Number 13 Page Name Power Gen

Alias Name PowerGen;PowerGn

Transaction

Date	Price Per Share	Shares Holding	Costs	Value
01 Mar 91	1.750	342.000	0.00	598.50
Holding		342.000	Invested	598.50

Dividends

Date	Net Dividend	Gross Dividend	Tax Credit	Tax Rate(%)
Year Total				

Statistics

Latest Share Price 2.740

Last Updated 08 Dec 92 Gain Of 338.50

Average Net Yield (%) 0.0 Latest Value 937.00

Shareholder

- Display
- Save
- Print
- Tools
- List
- Info
- Remove

Display

- Show/Edit page
- Delete page
- Page's history
- Page's forecast
- Portfolio value
- Edit price history
- Portfolio history
- Portfolio forecast
- Dividends list

Page Selector

McCarthy & Stone

Medeva

National Power

Power Gen

S7P

Scottish Hydro

New Page

● Share record page with menus

ADFS::HardDisc4.5.Shares

Info

Page Number 13 Page Name Power Gen

Alias Name PowerGen;PowerGn

Transaction

Date	Price Per Share	Shares Holding	Costs	Value
01 Mar 91	1.750	342.000	0.00	598.50
Holding		342.000	Invested	1104.50

Dividends

Date	Net Dividend	Gross Dividend	Tax Credit	Tax Rate(%)	
10 Dec 92	5.86	6.75	1.69	25.00	
Year Total		5.86	6.75	1.69	1992/1993

Statistics

Latest Share Price 2.740

Last Updated 08 Dec 92 Gain Of -673.42

Average Net Yield (%) 0.5 Latest Value 937.00

Calculator

5.86

7 8 9

4 5 6

1 2 3

0 . +

● Share record page with tools

teletext adapter – it doesn't matter whether it's Ascii or teletext data. You don't even need to save it, you just drop its icon on to any ShareHolder Professional 3 window. Since Shareholder's files are relational databases, each file updates every other.

How does the software recognise the share names? You have to educate it. Oracle on Channel 4 refers to British Petroleum as B P whereas Ceefax on BBC 2 calls it BritPet – Shareholder calls these abbreviations *aliases*. For each share, you list its aliases.

Be careful to include spaces and distinguish capital and small letters

– it's case sensitive. You save the aliases with the other share information. Now, whenever the software encounters an alias it updates the corresponding file with the new data.

Share information is stored in a conventional database way with a separate file of records called a page allocated to each share. The records contain fields for date, holding size, broker's charges and initial and current share price.

Other fields calculate the cost of the investment and the current gain or loss. And because a file, rather than a single record, is used for each share, the system can handle successive purchases, rights issues

and partial disposals of a share.

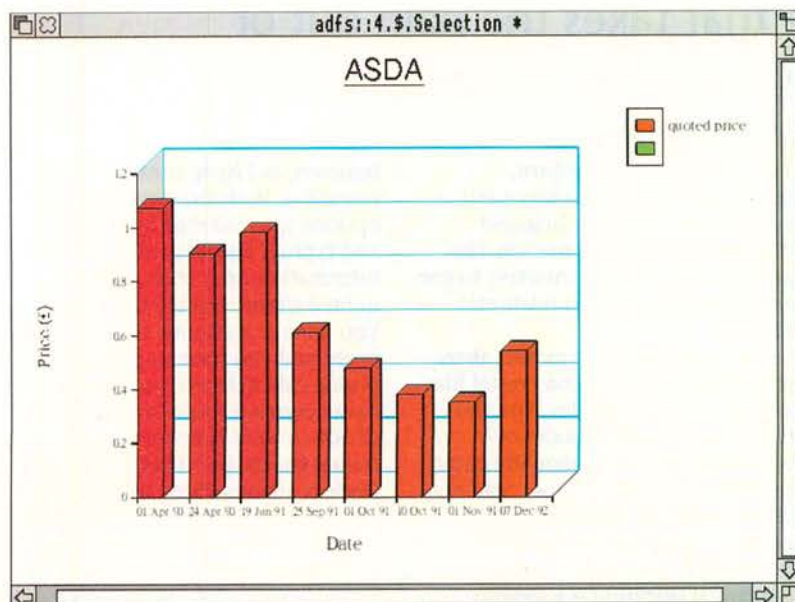
Despite this necessary complexity, the user interface is so designed that a share's information appears to reside on a single record card having a toggle icon to run the sequence of transactions on that share. The desirable result is that an involved sequence of transactions can be processed, but the user just sees details of the current deal.

A portfolio record can be printed, listing each share with its investment cost, current value and gain/loss, together with a capital valuation of the portfolio. Regrettably, you can't make your own choice of report fields, so other report options listing holdings and current values are unavailable.

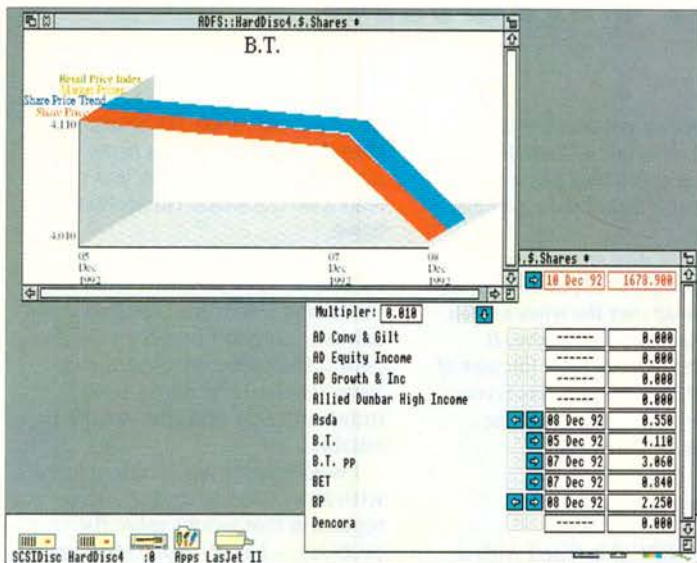
Blank records contain the word *untitled* in the name field, which you have to delete, and defaults of 0.00 in numeric fields so you have to be careful that the decimal point comes in the right place. In practice you will be alright if you enter the decimal point yourself as this overwrites the default one, but blank fields would have made life simpler.

Data validation is comprehensive and stops you entering negative share values or letters in numeric fields. Dates can be entered in convenient short form like 2.1.92 or 2/1/92 and are tidied up to read 2nd Jan 1992.

Calculator and calendar tools are provided and you can drag data from any field, including the calculator to any writeable field. This is the sort of nice touch for



● Edited shareprice history exported to Graphbox Pro



● Updating a share price

	Invested	Value	Gain Of
AD Conv & Gilt	3172.12	0.00	-3172.12
AD Equity Income	3818.88	0.00	-3818.88
Allied Dunbar High Income	4873.22	0.00	-4873.22
Asda	13766.85	15675.00	1736.38
B.T.	1848.00	3528.00	2488.00
B.T. pp	4148.00	5328.00	1188.00
BET	1798.12	1648.00	-188.24
BP	1137.00	1122.75	-43.25
Dencora	928.00	0.00	-928.00
Eastern Elec	2131.00	3288.00	1858.00
Gartmore Frontier	2719.56	0.00	-2719.56
ICI	3725.88	3817.50	63.48
Invesco Inc & Growth	3518.25	0.00	-3518.25
Land Secs	2188.56	1664.00	-489.12
Magnet A Conv	0.00	0.00	0.00
McCarthy & Stone	1023.00	725.00	-321.00
National Power	976.58	1528.92	552.42
Power Gen	1184.58	937.00	-673.42
SJP	1728.98	1788.00	-57.88
Scottish Hydro	459.88	661.58	282.58
Scottish Power	816.08	1889.68	273.68
Tanaris	3627.25	0.00	-3694.58
Triton	989.75	0.00	-931.58
Portfolio Total Value		42618.15	

● Portfolio report listing individual shares and total investment

speeding up data entry that you get from good design.

Dividends are entered on the same page as capital transactions. There are fields for date, net and gross dividend, tax rate and tax credit. Once you have entered any two of these monetary amounts, the software calculates and enters the remaining one.

The dividend totals in each tax year are totalled and a report file containing listings and annual totals for dividends and tax credits is automatically assembled. This report can be printed and contains the necessary information for non-taxpayers to claim back their tax credits and higher rate payers to cough up their surcharge.

The software also provides statistical results calculated from the data. You can enter monthly published Retail Price Index (RPI) figures and choose to have the gain/loss weighted to include losses in real terms due to inflation. You can also choose whether or not you want the accrued dividends to be included in the gain/loss calculation.

A parameter called share trend is displayed graphically along with the share price, though as the trend function is not defined, it is difficult to know what it is supposed to convey – unhappily, it will certainly not predict tomorrow's share price.

A share's history is presented graphically to show how the price varies with time. The graph plots four variables: Share price, price trend, RPI, and your chosen market index, such as the FT100. Though

Share	Price	Change
AAH	544	+1
AB Food	464	-1
AB Port	332	+2
ADT	479	-10
AMEC	68	-2
APU	185	-2
Aegis	78	-2
Airbour	256	+3
All Col	221	-2
All Iri	178	-2
All Lyon	629	-14
Amershm	683	+1
Amstrad	24	-1
Antofag	673	+1
Argos	288	+1
Argyll	397	-9
Arjo WA	158	-8
Asda	52	-2
Ashteyl	79	+1
Attwood	132	-5
BAT Ind	978	-1
BBA Grp	152	-1
BET	82	-1
BICC	296	-4
BM Grp	75	-1
BOD Grp	763	-3
BPB Ind	184	-3
BTP	228	+2
BTR	511	-4
Babcock	28	-1
Bouthrp	287	-8
Br Aero	376	-8
Br Land	85	-3
Br Pet	688	-3
Br Vita	263	-1
Br Steel	111	-1
Bradfrd	378	-1
BrakeBr	443	-1
BritAss	178	-2
Brixton	172	-2
Brown W	123	-1

● Data capture: Updating the portfolio from Ground Control's teletext software

an excellent idea, the realisation lacks the features found in specialist graphics software like Presenter GTI or Graphbox Professional.

The only permitted plot is a ribbon graph, which is marred by pixelation. The graph scale is fixed and there are no editing facilities. The price axis is not scaled, but the maximum and minimum prices are indicated. As a CSV file save option is provided, you can always import the data into Pipedream 4 or a graphics package if you want to extend your display options.

For tycoons handling multiple portfolios, it's worth mentioning

that Shareholder Professional can work with several Shareholder files on screen at once. The latest release comes with a useful utility called Batchgrab. This allows you to specify a selection of teletext pages to be saved to a single file.

Summing up

Shareholder Professional 3 makes a useful and competent portfolio management tool and with the addition of the data capture side in particular it becomes so useful in eliminating the dreadful chore of data entry that I have no hesitation in recommending it.

Dual drive problems

Mike Cool

AGENDA

- Connecting sideways ram
- Faulty mice
- Soldering stainless steel
- DIY IDE hard disk
- Mastering dual drives
- Updated sound sampling
- Intermittent drive errors

Q ON A few occasions since I bought a dual 3.5in drive I have disconnected the cables from one and used it with one 5.25in drive to copy files from 5.25in to 3.5in disks using a special connecting lead and *BACKUP or the Acorn COPYFILES listing.

The 3.5in drive was connected as drive 0 and the 5.25in as drive 1. On removing the 5.25in drive and reconnecting the 3.5in as a dual drive it worked properly.

After the last such use, I find that if either of the 3.5in drives is connected on its own as a single drive it responds to the command *MOUNT1 and ignores *MOUNT0.

So it appears that by some accident the original drive 0 has become configured as drive 1. As there are no movable links I assume that these drives are configured by some clever electronic means which I cannot fathom.

Is there any way I can change, what was originally drive 0 and is now drive 1, back to drive 0? A solution will be greatly appreciated.
— John Lunan, Weaverham, Northwich.

A I can assure you that there is no electronic method of changing the disk drive number. What happens is that there are four signals on the disk bus Drive Select 0 (pin 10), Drive Select 1 (pin 12), Drive Select 2 (pin 14) and Drive Select 3 (pin 6).

Somewhere on your drive is some

form of link that switches the drive select input on to one of these four pins. This could be something like a small PCB pad that is linked with a splash of solder.

Some double disk drives have both drives set to respond to pin 10 and use a cable to swap over the wires to pins 10 and 12 on the second drive. It sounds to me like you have this sort of thing and that your cable has become damaged or you are not using the correct cable.

Driving range

Q MY BBC B is fitted with a Watford 12 rom/ram board which carries several roms including the View family, GXR, AMX mouse, Mega Rom and the Acorn 8271 DFS and have experienced no rom clashes in the past.

I also have a 40/80 track disk drive and one 40 track drive both from Opus and powered by a Pace power unit so they are drawing no power from the computer.

I principally use the computer for wordprocessing in View. Recently I have been experiencing intermittent problems with both drives as sometimes they both refuse to save or load a file.

Until recently, cleaning the head appeared to solve the problem but I can only assume that this was a coincidence.

Now when I try to load or save a file on either, the drive will start but

the head will make no attempt to read the disk or make a noise similar to the one when you try to read a 40 track disk on an 80 track drive.

I have eliminated this possibility by double-checking the disks and the drives. I sent the computer and drives for repair but after a short period the problem re-occurred. I have also had the drives tested independently and they worked reliably.

I wondered if the problem lay with the DFS chip and whether replacing this would solve the problem. — I.R. Wilson, Mealsgate, Carlisle.

A You would be wasting your time and money replacing the DFS chip.

Most occasional faults stem from loose or an intermittent contact, mainly in connecting leads. This sounds most likely in your case as the fault appears to disappear when the system is moved.

It would be useful to get on to your repairers and find out what exactly it was they fixed. I suspect they just found it working. Therefore I would suggest that the lead connecting the computer and the drive be swapped for a known good one.

Sampling modes

Q I HAVE recently fitted Risc OS 3.10 to my A440 using the Acorn carrier board and have come up with a couple of problems, presumably caused by the new system.

The first involves your Archimedes sampling software complementing the Body Building Sound Sampler article. When I try to play a sound back though the software by clicking the play icon, I get the error message *Bad parameters at line 3420*.

On inspection I have found that this is the line at which the ChannelVoice command assigns voice 1 to the Digiplay module. I assume, owing to the fact the !DSEdit also crashed with the same error, that this is a fault with the speaker code common to both programs.

Is there a fix for this or a new version of the speaker module that will function on Risc OS 3? The

Soldering hints for stainless steel

Q IN the April issue you write *stainless steel definitely won't solder*. Not so. It solders quite easily in the normal way with an iron if you use phosphoric acid as a flux.

A few years ago it was easy to get hold of a solution which did the trick — liquid Jenolite rust treatment solution from car accessory shops.

Unfortunately, this doesn't seem to be available any longer. Jenolite is now a jelly and I have had no luck with that so you'll have to go to a bit more trouble to obtain the acid.

I use ordinary solder — even resin-cored will do, though plain solder is better — I haven't tried the new lead-free variety yet.

If you opt for the resin-cored, the resin and acid make a gungey mess which is difficult to clean away, though the joint itself doesn't appear to suf-

fer. I learnt this many years ago from a technician in a University Physiology Department and never cease to be amazed at how few people know about it. — L.G. Brock, Higher Bebington, Merseyside.

A Many thanks for the tip. I had not come across this method but appear to be in good company. When you use such a flux it is important that it does not spread too much and that the component is cleaned after soldering because of the danger of the acid corroding the other wires and joints over a period of years.

Incidentally, on the subject of solder, there is a low fume variety on the market but I have found it very difficult to make really good joints with it. Also I don't think that lead free solder is suitable for electrical connections.

esponds to another delivery of technical queries

second problem arises when I switch my computer between a non multi-scan mode such as Mode 16 and a multi-scan mode like Mode 20.

On Risc OS 2 if the screen was centred using the horizontal position control on my monitor while I was using Mode 16, when I swapped to Mode 20 it would still be centred.

However, with Risc OS 3 when I change to Mode 20 the display moves about half an inch to the left putting the picture slightly off the screen. It can be moved back again with the horizontal position control but doing this every time I swap modes is annoying to say the least.

The problem is compounded even further when swapping from Mode 16 to a VGA mode such as Mode 27 as the screen moves two inches to the left. I am using a Fujitsu General ME-503 Multi-Scan monitor. – **Richard Lancaster, Dersingham, Norfolk.**

A The sound sampler and DS Edit can be made to play back under Risc OS 3 if you change the line *CHA. to *ChannelVoice. The new OS takes this short-hand to be *ChangeDynamicArea, a new instruction.

The sound sampler requires new software in order to record under Risc OS 3. If you send the original disk direct to Musbury Consultants you'll get a free upgrade.

I rang up Acorn about your monitor problem. At first they said that the picture always shifts on their monitors when switching between different line

time modes and they were very surprised to hear that your monitor did not under the old system.

I think they have tried to correct this in the new OS, not succeeded for their monitors but have messed you up. Sorry, no cure here – that's progress?

A sideways Conundrum

Q I OWN a BBC B with a disk drive and tape recorder. I have a few games and utilities on disk and have been told that there are enhanced versions for those with sideways ram.

My friend was given a 16k sideways ram chip but it was useless to him as he has a A310 so he gave it to me with the fitting instructions. I fitted the chip and connected the two wires to the appropriate chip legs on the mother board. But to my surprise it didn't work. It has two leads – one from Pin 1 going to IC73 and Pin 23 goes to IC76 under the joystick port.

My friend discovered that I needed some additional software. Can you tell me how to get hold of this? – **P. Roberts, Anglesey.**

A Your friend is wrong, you don't need a disk program to activate sideways ram. If a game is capable of using it, it will be recognised.

What he could mean is that if you want to load and save software taken from sideways roms you could need a small utility to allow the disk filing system to read and write to this area.

However, as you know there are many different types of boards on the market and without knowing what

address the ram is switched to it is impossible to say exactly what utility you need.

Switching rodents

Q I HAD a problem with my Archimedes mouse and being familiar with electronics, decided to take a peek inside. I traced the fault to a microswitch failing to click, a simple problem but the solution was not.

My efforts to locate a replacement came to nothing. Acorn and their dealers were happy to relieve me of £35 for a new mouse but I don't want to pay this when the component probably costs no more than £1.

If anybody out there has a dead mouse, destined for the dustbin that I can butcher for the switch, there's a fiver to the charity of your choice plus your postage costs. – **Barry Watt, London.**

A It is a sad fact of life that an increasing number of consumer goods are only serviceable by throwing them away and getting a replacement. Bad marks to Acorn and the rest when it comes to ecologically sound manufacture here.

It is always a good idea to keep you old broken devices for spares, but you might need to sell that idea to others in your house first.

In the meantime how about swapping the microswitch over from the right hand button, that is less often used. You could replace that one with any push button for those occasions when it is needed.

You can write to Mike Cook c/o Acorn Computing, Europa House, Adlington Park, Macclesfield SK10 4NP.

He will answer any questions about difficulties you may be having with your machines, mainly those to do with hardware. If you want a personal reply ensure that you enclose an SAE with your letter.

Build your own IDE drive

Q I WOULD like to upgrade my A310 with an IDE hard drive but I suspect that it would be cheaper to buy a separate Archimedes IDE interface and PC drive.

However, will a PC drive plug into an Archimedes IDE podule and fit on the disk drive bridge without modification and will I need a special front panel to accommodate the drive and if so are they only available by buying an Arc drive?

Is the currently unused lead from the PSU with the plug like that for a 5.25in floppy drive suitable to power an IDE drive?

I have twin floppy drives and I understand I will have to remove the second one to make room for an internal hard drive, but I would rather do this than have an external hard drive.

Do I have to move the terminating resistor pack from one drive to the

other for a single floppy configuration? – **A. Houghton, Woolston, Southampton.**

A I am not sure whether you can get simply an IDE interface for the A310 – although I believe that Ian Copestake Software used to manufacture just the interface and may still do so. All the ones I have seen have come with a hard disk attached and fit in the podule space. With some interfaces it is possible to get extra hard drives to go on the end of the bus and the PC devices should be suitable in this case.

However, it is not an internal option and so you need not worry about fitting the hard drive on the front panel of the computer. Finally, remember not to mix up IDE devices and Acorn's internal hard drive, as these are two separate things.

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Free for all

Teri Paul takes on some programs to help your literary talent, ability, agility, aptitude or capability

THE public domain is the ideal place to find useful bits and pieces to complement commercial products. For most you pay a nominal amount for a disk of programs and even shareware costing on average £5 per registration is good value for money. Moreover, some fantastically useful programs exist only in PD form.

For instance, if you feel your foreign languages could do with a bit of spit and polish I'd definitely recommend the *Say it Quiz* range of language tutors. My French and German versions – *Sprich* and *Dis-le* – came courtesy of ArchAngel (disks EO7 and EO8).

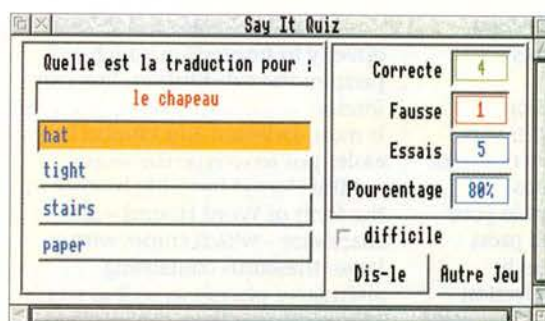
These programs are shareware rather than PD and programmers Bits 'n Bytes promise other languages too including Chinese, Spanish, Norwegian, and Finnish.

There are two difficulty levels and on the easiest you are given a word visually and verbally and a choice of English meanings. Click on the one you want and you'll be told in a variety of phrases whether or not you are correct. The words are random and a count is kept of your success. The *Say It Series* also works well as a pronunciation guide owing to the good clear sampled speech, and on the harder level you are only given the spoken word but there is a repeat word button.

If you prefer to stay with English as she is wrote you could do worse than take a look at some of the PD thesauri and spelling checkers around. Most commercial

wordprocessors and DTP packages come with at least a spelling checker built in, but if you use a variety of packages and have a specialised word list, a checker you can use with all the packages is useful.

The excellent AMF series has a spelling checker which lets you



● *Speaking in tongues, with Sprich and Dis-le*

import text files which can be checked – useful for some ReadMe and Help files I've come across. AMFSpell contains over 65,000 words and also allows you to create up to eight 4k dictionaries of your own.

AMFSpell loads on to the iconbar and you just drag your Edit file on to it. You'll be told the checking speed and given the option to save. You have to drag the save icon to a disk to start the checking process.

As a document is checked, four approximations are given if a match can't be found but you can always check individual words in the window. You can either Use or Ignore the result or Add the word to your user dictionary. You can't add to the original dictionary because this is compressed for faster operation but creating your own wordlists is straightforward.

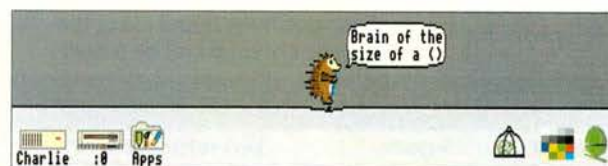
You can pause or abort at any time and the Checking window lets you know how the process is going.



● *AMFSpell checks your text files whatever their source or destination*



...or just listen to the excellent speech for a more difficult challenge



Another box gives the speed, in characters per cycle.

AMFSpell is quite sophisticated with the ability to select Preferences from the iconbar menu. Here is where you set the default checking, whether AMFSpell recognises apostrophes and hyphens as parts of words, if you want audible beeps and if the *Load user dictionaries on start up* option is selected, your user dictionaries will be loaded with AMFSpell. A very flexible utility.

A very nice dictionary-cum-thesaurus is *Mini Hound* by Ian Palmer. This shareware program has over 30,000 keywords and runs in the usual way from the iconbar.

When selected a window appears where you can type in the word in which you're interested and click on Search. In the tutorial which comes with the program you're given the example of *alternative* and the search comes up with 10 meanings from *variation* to *oscillation*. If you want to know more about a particular word click on it.

After a short pause another window appears which contains the full thesaurus entry. Again moving the mouse pointer over any of the words in this window and pressing Select will pass that word to the caret – pressing Adjust will perform a search on that word. Pressing

● *Welcome your new iconbar pet, KangaKoe*

Menu anywhere over the window brings up a save window allowing you to save the full entry as a text file.

There are also Wild Card and Sounds Like searches. Both can be used when you can't remember a particular word – or how to spell it. The Wild Card search will bring up the thesaurus listing when you type the first few letters and a * while the Sounds Like search tries to cope with the most atrocious misspellings.

As a confirmed Impression user the link with Mini Hound is very useful. For the hotlink to work Mini Hound's Enter window must be open – select the word inside your Impression document and press Shift+Insert. A normal search begins, bringing up the Selection window as normal. Or you can press Ctrl+Shift+Insert for Mini Hound to put the word in its Enter window.

When you've found the word, click Select over it and using the Impulse system it will be passed



● Splodge isn't contagious but it is addictive

directly to Impression which will perform the substitution. You can interact with other packages but this is more awkward and I found it easier just to re-type the words.

Mini Hound has a big brother in the form of Word Hound – also shareware – which comes with a larger thesaurus containing alternative phrases as well as words. Moreover, you have can also add your own words and definitions. However, at just over 3.5Mb of data Word Hound is a hard disk application though it will work on 1Mb machines.

Game, set and match

After all that word manipulation you may feel like a bit of mindless alien shooting. However, for puzzle-fiends out there the following games are musts to take your frustration to new heights – or depths.

J. Horsnell has produced a series of Patience games – sometimes called Solitaire, though to me that is

a round board with pegs. If like me you didn't like the Risc OS 3 update to Patience you will like this collection of nine games with the option to program your own devious favourite.

SPatience comes in the standard form called 28 Card but there is also 21 Card, 40 Thieves, DoublePack, Exorcist, Mindwarp, Seahaven, Syrian and Wholepack. Rules and scripts for each game are provided, but for the seriously disturbed, books have been written on the subject:

Complete Book of Patience £4.99 (Faber)

Patience Games £1.99 (AC Black)

New Book of Patience Games £2.99 (Foulsham)

Games of Patience 50p (K Mason)

Patience Games – Pick up a pack £2.50 (Elliot Wright)

Splodge is different, as well as being written by a Douglas Adams fan, it is a mixture of Repton, PacMan and goodness knows what else. The plot is easy: There are seven diamonds to collect, clocks to rob you of a life, others to given you extra time and secret tunnels to aid or hinder as well as gravity.

The only tricks come in the form of one way tracks, holes and just when you sort this out someone changes the order you've got to collect the diamonds in. Big graphics and passworded levels will help, but the ability to map quickly is a must.

... and reet daft

Anyone who has read this column will know of my penchant for desktop sillies so you'll appreciate my glee at discovering **KangaKoe** created by Tijmen and Dirk van Gulik – who also have an appetite for apple pies. There is a very nice recipe for a dutch version hidden in the help file.

But what or who is KangaKoe? The caged creature of the icon becomes a pogo-sticking hedgehog with an attitude, who becomes resident on top of the iconbar. He does interfere with my backdrop of Risc OS 3.1 but I can always change my backdrop.

Ben Summers clearly went nuts doing his GCSEs and to calm himself produced **FlowerPower**. This extraordinary module draws flowers on the screen under interrupt and will work on any machine and shouldn't interfere with normal operation. It's got piles of parameters and is one of the cleverest and silliest things I've seen yet.

This month's PD featured

Product	Supplier	Disk reference
AMFSpell	ArchAngel	W04
Dis-le	ArchAngel	E07
KagakOe	Digital Illusions	–
Mini Hound	ArchAngel	W03
	DataStream	005
SPatience	Craig Beech	–
Splodge	Datafile	–
Sprich	ArchAngel	E08

PD LIBRARIES

8 - BIT HOUSES

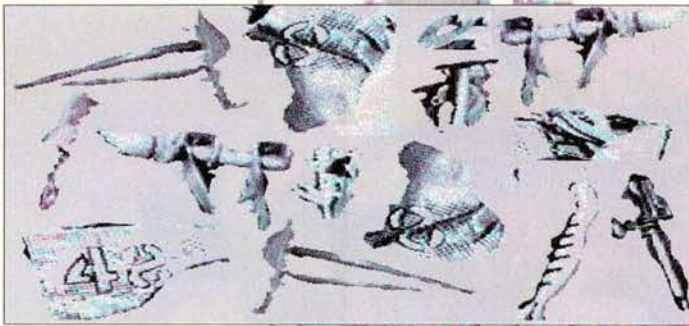
8-bit Software, 1 Oakwood Drive, Heaton, Bolton BL1 5EE.
BBC PD, 18 Carlton Close, Blackrod, Bolton BL6 5DL.
Eik PD, 5 Edward Street, Clifton, Brighouse, Yorkshire HG6 1QR.
Frisky Clams, 37 Cassiobury Drive, Watford, Herts WD1 3AA.

HeadFirst PD, 97 Chester Road, Southport PR9 7HH.
JJF PD, 49 Hollyberry Close, Winyates Green, Redditch, Worcester B98 0QT.
Mad Rabbit Public Domain, PO Box 4, Crigglestone, Wakefield, West Yorkshire WF4 3XE.
Welsh Boys PD, 88 Queen Street, Barry, South Glamorgan CF6 8EE.

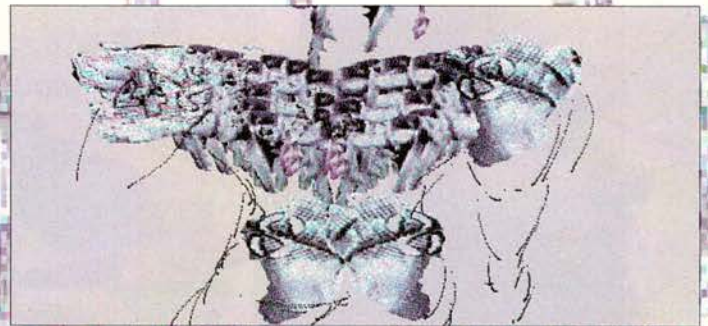
32 - BIT HOUSES

3PD, 66E Picardy Road, Belvedere, Kent DA17 5DN.
Abyss Software, 35 Grantley Crescent, Kingswinford, Valley Fields, West Mids DY6 9EH.
Alpine PD, PO Box 25, Craigavon, BT63 5UT.
APDL, 39 Knighton Park Road, Sydenham, London SE26 5RN.
Amicom PD, 11 The Square, Alveston, Bristol BS12 2PE.
Arcaynia, PO BOX 1927, Sutton Coldfield B74 3YZ.
ArchAngel, 9 Chancel Court, Chancel Lane, Pinhoe, Exeter EX4 8QE.
ARMistic, 136 Wellesley Road, Ilford, Essex IG1 4LJ.
Busy Bee Computers, PO Box 25, Ormskirk, Lancashire L39 3QR.
Craig Beech PD, 52 Margeholes, Carpenders Park, Watford, Herts WD1 5AR.
Datafile PD, 71 Anson Road, Locking, Weston-super-Mare, Avon BS24 7DQ.
DataStream, 34 Norbreck Close, Great Sankey, Warrington, Cheshire WA5 2SX.
Demon DPD, 3 Marshall Close, Fishtoft, Boston, Lincs PE21 0RX.
Diamond PD, 86 Meadowbank, Moor Lane, Holway, Holywell, Chwyd CH8 7EF.
Different Ideas Music, 48 Merthyr Road, Dallington, Northants NN5 7BS.
Digital Illusions, 20 College Road, Wembley, Middlesex HA9 8RL.
Digital Phenomena, 104 Manners Road, Southsea, Hants PO4 0BG.
DigiTech PD, 20 Downing Crescent, Bottesford, Scunthorpe, South Humberside DN16 3LS.

DoggySoft, 7 Blackhorse Crescent, Amersham, Bucks HP6 6HP.
Equinox PD, 27 Station Road, Earls Barton, Northampton NN6 0NT.
Five Star Marketing, 18 Woburn Close, Bushey, Herts WD2 3XA.
GemPD, 15 Partridge Down, Oliver's Battery, Winchester, Hants SO22 4HL.
HeadFirst PD, 97 Chester Road, Southport PR9 7HH.
I-APL, 11 Auburn Road, Redland, Bristol BS6 6LS.
Kingsway Computer Services, 72 Glencoe Road, Sheffield S2 2SR.
Low Cost PD, 6 Furzeland House, Sheephouse Way, New Malden, Surrey KT3 5PH.
Matt Browne PD, 5 Inglefield, Potters Bar, Herts EN6 1HD.
Moonlight Graphics – Shareware, PO Box 3569, Cape Town 8000, South Africa.
Naked PD, Fayence, Fulford Road, Fulford, Stoke-on-Trent ST11 9QT.
Ozone-Friendly PD, 180 Cumnor Hill, Oxford OX2 9PJ.
Power to the Programmers, 1st Floor, 23 Cooper Street, Nelson, Lancashire BB9 7XW.
RML PD, 24 Penryn Close, Norwich NR4 7LY.
Skyfall, PO Box 2220, Birmingham B43 5R2.
Spidersoft PD, 218 Saville Park Road, Halifax, West Yorkshire HX1 2XS.
Westbourn Services, Westbourn House, 34 Bradley Street, Wooton-under-Edge GL12 6AR.



● Drawing elements cut from digitised images of an original sculpture



● Drawing for a future sculpture using elements of an original

THIS is the second of two articles dealing with video digitisers art and design work. This month we'll be concentrating on digitised images and electronic collage as well as how to use a video digitiser in digital photography.

All the images illustrating this article come from a series of summer term CAAD workshops. The student-teacher who produced the electronic collage in the February 1993 article, Andrew Green, started by digitising a large monoprint which he had produced as part of a previous printmaking course.

This was digitised in Mode 15 – though Mode 21 or 28 would have given more detail. He wanted to make the digitised version look more mechanical so he collected pieces of TV sets, printed circuits and so on and digitised them.

From this series of screens he produced a set of cut-out components and applied these in turn to the digitised monoprint. The cut and paste options of Revelation speeded up the creative process and led to a range of varied images.

The quality may not be as good as in a conventional collage but a digital collage has a wide range of production techniques, parallel image development and multiple colour rendering to offer. It's also a very quick and flexible medium to work in once you have the digitising system set up and the collage resources organised.

There was too much of a contrast between the subtly shaded monoprint and the hard-edged electronic components so the edges of these were blended to make them look more natural – a tool available in most painting packages.

Tools can be used to blend or smooth a whole section of the screen in one go or local blending can be applied successively to parts of the image using a paint tool.

It's worth experimenting with the two options to see which is easier to

control and gives the best results. Remember to save your picture just in case the blending goes too far and ends up as an irretrievable muddy mess.

Another technique you might like to consider is blending disparate picture elements into one image is by applying the colour scheme of the base picture to the elements being added.

Kit of parts

This approach of using a *kit of parts* was used by another student-teacher, Alan Johnson, who has an abiding passion for American Football. My recent work uses an assemblage approach joining often identical industrial scrap into a recognisable whole.

The work is generally related to the human anatomy and attempts to form metallic scrap into an inflexion of a life drawing. The process of building movement into ferrous scrap is time consuming and unforgiving. The computer offers me endless opportunities to

experiment and explore ideas and also gives me the ability to produce hard-copy of my ideas.

The work displayed replicates my method of working when producing the sculptures. Using a computer as an integral part of my design process offers me the ability to exploit the almost limitless visual alternatives.

From this you might gather that he's also a sculptor and had seen the possibilities for computer-based sculpture. The way he produced his series of drawings was by digitising a sculpture of an American footballer made from scrap materials.

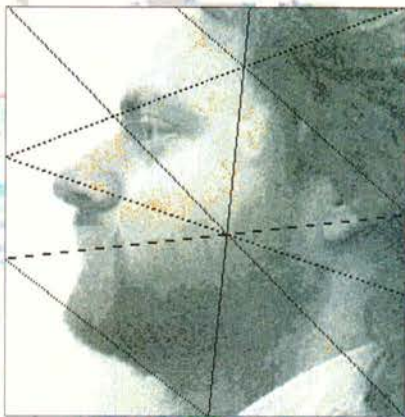
He cut from the screen a kit of parts to produce on-screen sketches of further sculptures which might be produced from scrap but ended up being developed entirely on the computer screen.

By now you should be getting away from the idea that the computer image is the end of the creative chain and thinking of it as a part of a longer creative process.

An architect, Richard Long, was

Improving your self-image

Steve Bruntlett challenges a range of artists and non-artists with creating computerised artforms



● Digitised image with the lines added ready to be laser printed



● The final image with overpainting and collaged elements for the original image

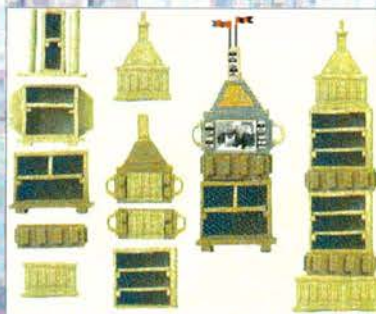
initially antagonistic towards the use of the computer in art and design but began to use it as a tool in the development of more complex imagery than is perhaps usual.

He had produced a series of digital self-portraits and drawn a series of lines along which to cut. He laser-printed a section of one, mounted it on to card, cut it into sections, produced a maquette for a sculpture, re-digitised the maquette and cut and pasted the resulting digitised image with parts of the original.

He re-painted sections to produce an image whose generation process raises interesting possibilities for creative art and design work.

Most people are content to produce an image on screen but in CAAD we should push the medium as far as it can go while bearing in mind that every time you re-digitise an image you're likely to lose quality. So you need to start in as high a resolution mode as possible.

Having said that, the next illustration shows what you can do in Mode 15 on a basic machine. As soon as computer users wake up the idea of using the computer as part of a wider creative process alongside traditional art and design



● Digitised maquettes and collaged assembled tower structures

media then we're likely to see some really exciting work in this field.

Ian Crosbie – a professional photographer – wanted to explore the use of a computer-based digitising system as a substitute for and extension of conventional photography.

His work centred on the use of conventional photographic silhouettes which after digitising were dropped into Revelation, overpainted, processed and treated with colour in ways which he felt would have been impossible with traditional colour photography.

One possibility I'm intent on investigating is using the Canon Ion still-video camera to produce an electronic *joiner* of monochrome and coloured digitised screens. A joiner can be simply described as a linked and overlapped set of photographs forming a larger image than would be possible with a single photograph.

Hockney produced the original joiners with conventional photographs a good few years ago but that's a slow and expensive business.

The electronic route is faster and cheaper and more flexible if you want to retake digitised images. Using a still-video camera you could take the pictures on site, dash back to your computer, digitise them,

store them on disk, print them out on a laser, put them together roughly to see if you have any gaps or weak spots, dash back to retake some of the shots or extend the work before the light's changed, never mind waiting till your pictures come back from processing.

Doing it yourself

The intention of this last section is not to guide you through a piece of work stage by stage but to show you a particular way of working and an example of the finished piece of work which will inspire you to try out some of your own ideas using one or more of the techniques described.

For example, if you were to digitise a series of scaled architectural features from buildings in your neighbourhood you could produce a kit of parts with which to construct a townscape, fantastic house or palace.

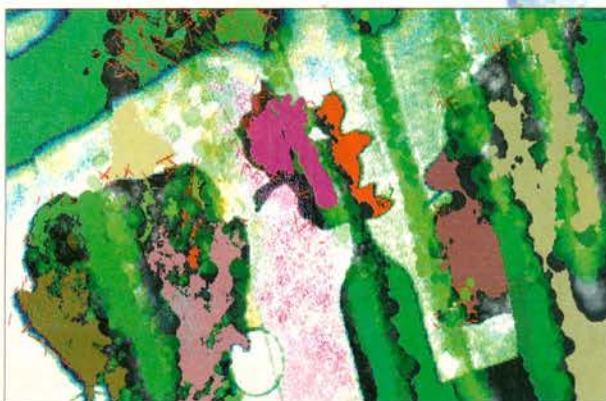
Windows, doors and wall sections could be captured on location, digitised and re-scaled into discrete units which when placed on a grid in Vector, ArtWorks, DrawPlus or even My World – having turned the sprite files into drawfiles using a program such as Iota's Outliner.

There they would interlock very neatly, doing away with a lot of fiddling about leaving you time to produce something really striking.

Have a go with these techniques and see what you come up with. If you produce anything interesting or have a different approach to the use of computer-based imagery then please send me some examples care of the editor. It would be nice to get some kind of dialogue going which would feed into the long term development of CAAD.

● Next month Steve Bruntlett explores another aspect of the world of computerised art.

● Overpainted and false coloured digitised silhouette



The delicate art of

IN the last couple of articles we've looked at the process of creating songs using Tracker programs. Trackers use sampled sounds and there are already hundreds of samples out there in PD land and in demos waiting to be borrowed.

However, there is a school of

thought, particularly among some musically uneducated pedants, which believes that the creation of original music demands the use of original material – including samples. I don't necessarily subscribe to that point of view – life's too short unless you're either rich or unemployed – but there's no

doubt that creating your own samples is an intensely creative and satisfying process.

There are a handful of samplers for the Archimedes. The best-known are probably Clares' Armadeus and EMR's Sampler 8 although there is also the recently-released Leading Edge Econet-based Midi and Sampler Interface which was reviewed in our May issue.

We looked at the different types of sample format in our December issue so we won't go over that again. In this article we'll take a close look at the sampling process and see how to make the best use of whichever sampler you have.

Getting converted

The basic principles of sampling are the same whichever interface you use. The sampling process takes an audio signal (which is analogue) and converts it to a list of numbers (which are digital) using an analogue-to-digital converter. This is abbreviated to A-to-D Converter or just ADC. To play back a sample, the numbers are converted back into sound using a Digital-to-Analogue converter – a DAC.

The ADC is built into the sampler hardware. If you can play back samples through the hardware, it will also have a DAC. The Archimedes can perform the DAC process which is how it can play sounds through its speaker and send them to the audio out/headphone socket.

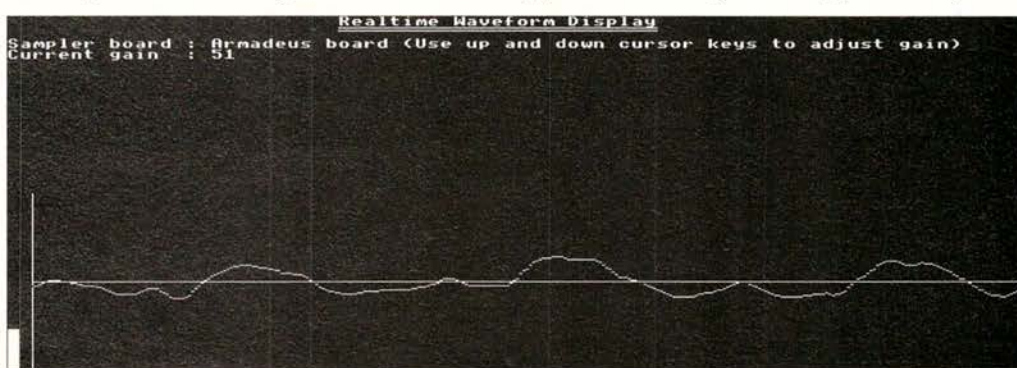
Rates and resolutions

Two main parameters determine the quality of a sample – the sampling rate or frequency and the resolution.

When an ADC is at work, it reads the incoming signal and measures it – or takes a *sample* of it – every so often. The number of times it performs a measurement is referred to as the sampling frequency or sampling rate and this is normally



● The input volume is too high and the waveform is clipped as it bashes against the upper recording limit



● Here the input volume is too low and the recording will contain system noise



● Just right. The input volume is about as high as it can be without clipping

f sampling

Ian Waugh takes you along the music staves

expressed in KHz or *samples per second*.

Some samplers, enmeshed in the world of computing rather than music, specify the rate in micro seconds which, I feel, can only confuse everybody. Here's a conversion list taken from the Armadeus manual:

Microseconds	KHz
24uS	41.6
48uS	20.8
72uS	13.8
96uS	10.4

The higher the sampling rate, the more samples will be taken and therefore the more accurate the digital representation of the sound will be. For comparison, CDs use a sampling rate of 44.1KHz.

Accuracy matters

The sampling resolution is the accuracy or fineness of the measuring scale. This is quoted in bits and the more bits you have to store the data in, the more accurate the result. For example, if you are measuring a flagpole, you will get a far more accurate picture of its size if you measure it to the nearest inch rather than the nearest foot.

Most modern commercial samplers are 16-bit although some are 12-bit. CDs use 16-bit resolution. Although the Archimedes is a 32-bit

machine, the samplers for it are only 8-bit which is generally regarded as being a little on the low side for professional results although I have a friend who uses 8-bit samples on his demos to great effect. This does mean, however, that you need to take care to create the highest quality samples you can.

Ideally, you would sample everything at the highest possible sampling rate. However, the trade-off is space – the higher the rate, the more ram and disk space the sample will use. A one-second 8-bit sample taken at 44.1KHz, for example, will be over 40k in size. Therefore, in the interests of space conservation, compromises are generally made.

So how low a sampling rate can you use? A mathematician called Harry Nyquist worked it out. The Nyquist theorem states that in order to accurately sample a sound at a given frequency you need to use a sample rate twice that frequency.

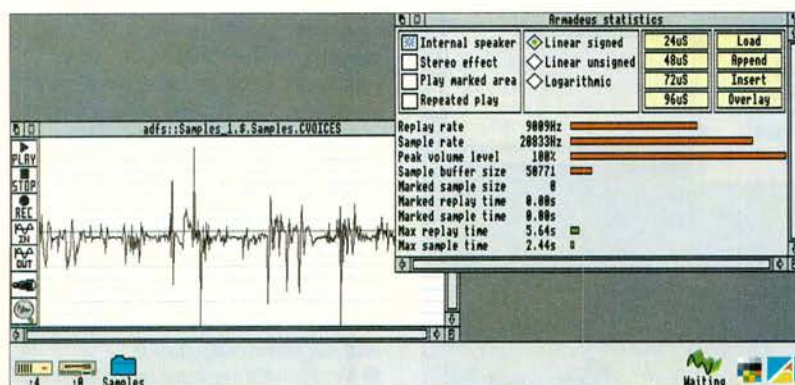
The average human ear can hear frequencies up to about 15KHz – although some people's range goes up to 20KHz – so a sampling rate of 30KHz will do a fair old job of most sounds. That's why the CD sampling rate of 44.1KHz sounds so sharp and clear.

However, not all sounds contain such high frequencies. Most drum and bass sounds are considerably lower and even the

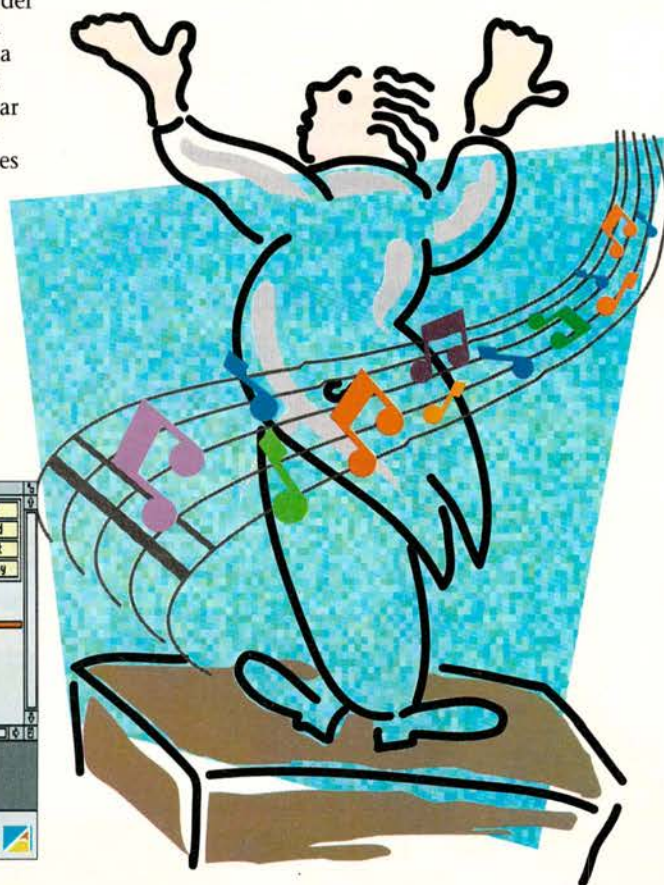
human voice doesn't always reach that high. A reasonable compromise, therefore, is probably about 20KHz although you will be able to record some low-frequency sounds at 10KHz without too much loss of quality.

Aliasing

If you try to sample a sound which has frequencies above the Nyquist Limit – one with has frequencies higher than half the sampling rate – you'll likely hear some unpleasant harmonic grunges. This is *aliasing* and it occurs because there is insufficient information about the sample to reproduce it correctly. In other words, the low sampling rate doesn't allow the ADC to take



● Recording a vocal sample using Armadeus



➤ enough measurements.

If aliasing is a problem, experiment with the sampling rate. Most samplers and sample manipulation programs have filters which can help reduce noise but the ideal time to filter a signal to prevent aliasing is during recording. Once it's in the computer, the damage has been done.

There are two other types of noise

you might meet. One comes from the *error component* caused by the sampling resolution.

As already discussed, the more bits there are, the more accurate the digitisation process. Sound isn't so smoothly represented by 8 bits as by 16 and when the data is converted back into sound, the difference manifests itself as noise.

There's not a lot you can do about this except to make sure you record at an optimum level.

This brings us to the third noise source – the one you

introduce during recording. The secret of creating a good sample is to get as much signal as possible into the sampler but without clipping, which is what happens when a signal overshoots the maximum dynamic range of the sampler.

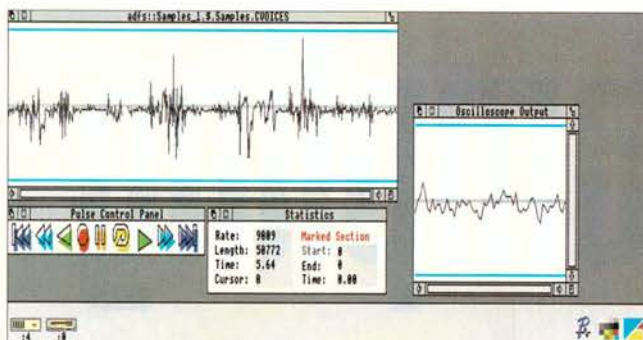
To help you set up the optimum

Mic and line

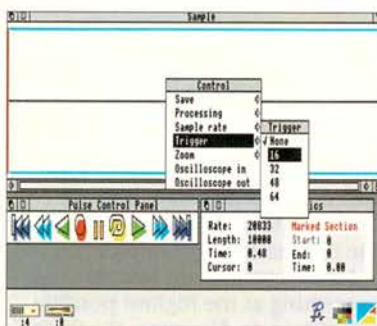
Some samplers such as Armadeus have both Mic and Line inputs and the difference between the two is important.

Without getting too involved in the technicalities, most microphones have a low impedance. This is an electrical term which denotes the degree of resistance to an alternating current, and is expressed in ohms – you don't have to know this to use the sockets correctly. The advantage of using a low impedance microphone is that it is less susceptible to noise even if the cable is long.

A Line input has a high impedance and is designed to take signals directly from equipment such as synthesisers, CD players, amplifiers and so on. If in doubt about which to use, try both inputs and monitor the results.



● The same vocal sample in Leading's Pulse sampler



● Pulse lets you select one of four Trigger levels

recording level, use the recording meter function of the sampler to monitor the incoming signal. Adjust the volume so it is as high as possible without distortion. There is always noise in any audio system and if you sample at too low a volume, the inherent noise will be audible.

Finger on the trigger

Most samplers have a trigger function which lets you set a volume level at which sampling will begin automatically. This is useful if

you can't be near the computer to manually start recording.

It can also be used to record a loud part of a sound source which is preceded by a quieter section. However, triggering levels are notoriously difficult to set up and you may well lose part of the initial attack of a sound.

The method I prefer is to start sampling just before the section I want and edit out any unwanted sound. Whatever you sample, you'll have to trim it anyway so it's no hardship.

Multi-samples and munchkinisation

Recording a sample is one thing, playing it back is another. If it's an effect to be played only at the recorded pitch, that's fine. But if you have sampled a sound you want to play across several pitches you have to take into consideration the relationship between pitch, timbre and playback speed.

The further away from its original pitch a sample is, the more distorted its timbre or tone becomes. This is known colloquially as *munchkinisation* – if you've seen the Wizard Of Oz you'll know why.

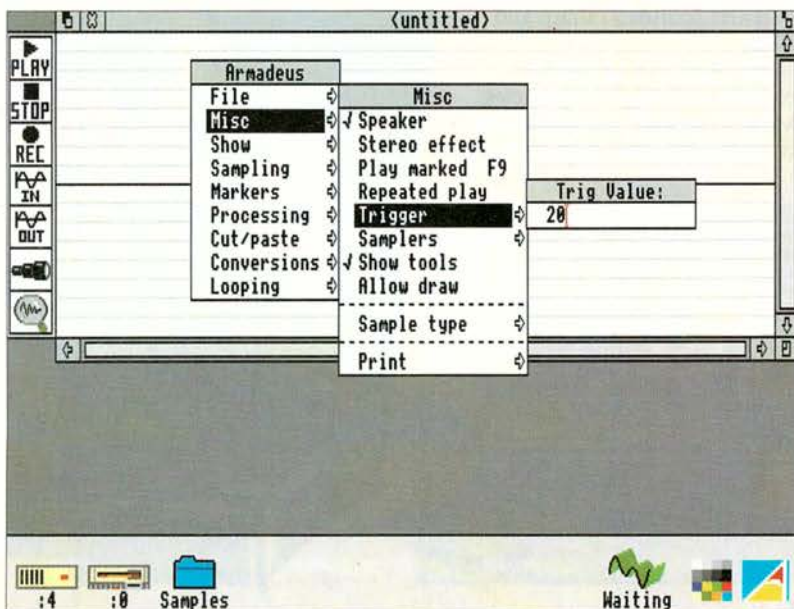
Also, changing the pitch of a sample involves changing its length. If you play a violin sample which lasts for a second an octave lower, it will last for two seconds.

For these reasons, if you want a sound to play over a wide pitch range you need to record several samples of the sound at various pitches throughout the range.

Ideally, you would sample every pitch but that would take up so much memory it's not practical. Again you need to do a trade-off between quality of sound and available memory.

The widest range over which you can reasonably spread a single sample is about six semitones up and six semitones down.

● Next month we have more hints and tips for making good sound samples.



● Armadeus lets you enter any Trigger value between 1 and 127

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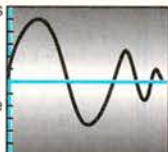
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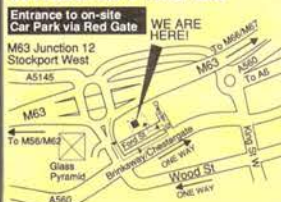
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VISA

Martyn Gilbert continues his in-depth analysis of how Ethernet operates

HAVING examined the hardware in some detail – and we'll be coming back to it again – we now need to consider the impact this has on the software and what help the software needs to run.

Ethernet is structured in layers. The lower ones are concerned with transferring data through the network while the upper layers are related to managing the services the network provides. This layered structure is adopted to provide a manageable and maintainable system on the basis of *divide and conquer*.

Like all software, network software has to be well specified, designed and implemented. Splitting it up into layers allows it to be taken piece-meal and implemented as smaller, manageable and testable units.

However, there is more to it. When you sit at a computer and load a file from a server you are usually calling on large amounts of software to *talk* to each other for your benefit. The end result is the file appearing in your computer's memory.

It is often the case though that before it gets to you, it is routed through other equipment that you never actually see. Whether the data

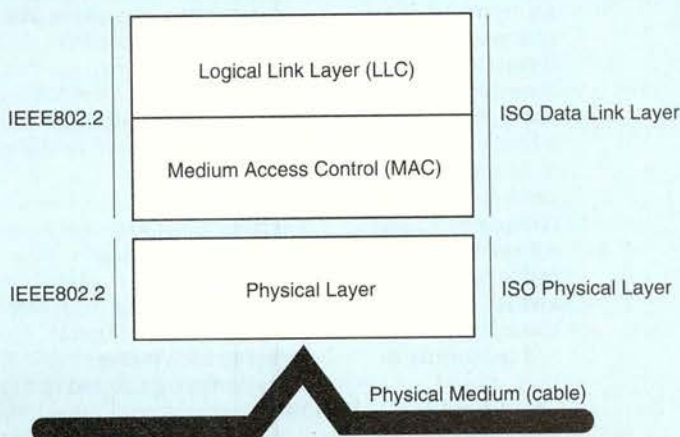
comes direct or via a more complex route should not be apparent – the whole process should just work.

To achieve this routing, equipment uses parts of the network software but ignores others. This is a vitally important concept. By using software layers with a standardised interface between them, you can use hardware and software from a variety of suppliers with the confidence that they will work together.

Routing is just one example of where this is important. Just as IEEE802.3 established the hardware requirements for physical interconnectivity, so IEEE802.2 specifies the software interfaces.

Even if your hardware complies with IEEE802.3, if the software does not comply with IEEE802.2 – and, for Acorn's 32-bit computers, Acorn Universal Networking (AUN) which we will be describing next month – you will be tied to buying equipment from one supplier because it probably will not work with anyone else's.

To be precise, Ethernet IEEE802.3 and 802.2 define the physical and data link layers as defined by ISO Open Systems Reference Model (ISO 7498:1984). This is a large and important standard which is the



● Figure 1: The lowest levels of a network

Connectivity plus



model for how most networks in the world today are divided up into manageable sub-systems.

The ISO standard was, however, written after Ethernet was originally designed and so the division of functions in the Data Link Layer between the LLC and MAC is not a totally *clean* one, see Figure I. In most Ethernet chips the MAC is performed by hardware. It is mainly controlled by MAC software but some functions are directly controlled by the LLC.

The physical and data link layers are the lowest levels of the ISO seven-layer model and have sub-layers within themselves. Next month's article will explore these and higher levels of Ethernet software for the Acorn 32-bit machines.

Bits, bytes and buffers

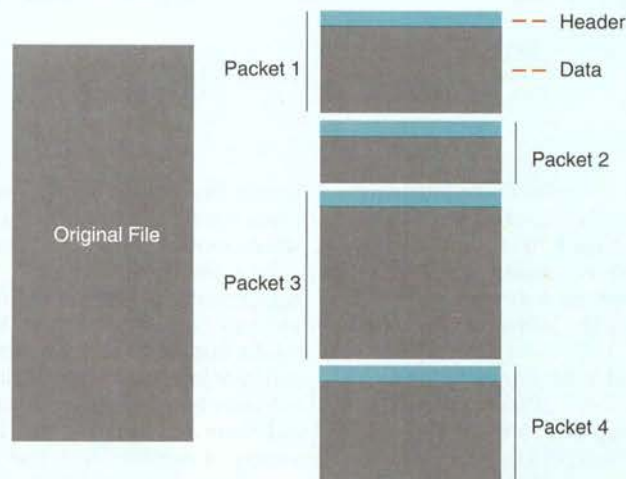
How does data get from the cable through the Medium Access Control Layer and be presented to the Logical Link Layer? Just transmitting data on to the network does not mean that anyone will receive it.

Data is *wrapped* up with other information such as who it is intended for, who has sent it and which part of the data is the bit you asked for.

These various bits of information, their size, purpose and sequence of transmission are referred to by the general term of *format*. The format is usually specified as a structure of bytes, each transmitted one after the other.

A computer receiving data in a particular format will be able to

● Figure III: Sending data in chunks allows other machines to use the network simultaneously



understand it if the transmitting computer sends it in the same standardised format. Each format is designed to facilitate a software protocol – a specified interface between two or more pieces of software that allows them to communicate.

Different LLC formats are often found between different types of computer on a network but it is essential that they are at least sufficiently similar to enable them to be rejected by computers which are not intended recipients.

If an *ad hoc* format is used, non-recipient computers might not be able to distinguish it from *damaged* data transmitted under their own formats. The non-recipient computers then waste a lot of time trying to unscramble the mess.

In Figure II computers A1 and A2 are trying to communicate using format A. On the same piece of cable, computers B1 and B2 are using format B. As they share the same cable, computers A1 and A2 will see the traffic between B1 and B2. Even though they do not use format B they should understand it enough to know that it is a valid format and not just

damaged data between themselves.

This is why it is so important that all computers on the network use MAC and LLC layer formats which are either the same or at least co-exist.

An example of this would be Archimedes computers using AUN working on the same cable as IBM PCs using Novell NetWare.

Usually, controller chips on Ethernet adapter cards have most of the MAC layer implemented on chip. Let's assume that you are sitting at a computer and have requested a file from the server. This server will send the data over the network in packets – *chunks* of requested data.

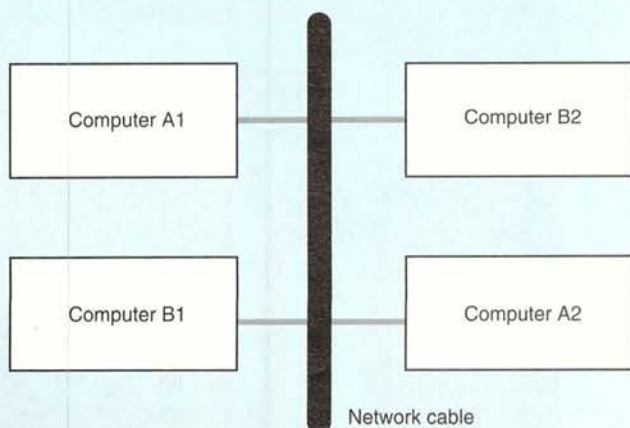
Header information

Figure III shows the original file spit into a number of packets. The total amount of data transferred over the network is larger than the original file due to header information used by the software protocols. The packets don't have to be the same size.

By transmitting just part of a file at a time, other users get to share the network's resources. Your controller gathers the bits from the network, assembles them into bytes and places these in buffers with one packet to each buffer.

The buffers are stored in ram directly connected to the controller chip. A particular controller only gathers data intended for the computer in which it is fitted. If the

● Figure II: Talking in different formats on the same data link



data is faulty, it will be rejected and your computer will have to recognise that a packet has been lost.

A controller *knows* whether or not data is intended for it by its Globally Unique Identifier (GUI) – not to be confused with the other GUI which is a Graphical User Interface. This is a 48-bit number allocated to each Ethernet Adapter card during manufacture.

No two cards have the same number, with Ethernet card manufacturers applying to the IEEE in New York for an Organisationally Unique Identifier.

This is a 24-bit number used to provide the first three bytes of the GUI. Card manufacturers supply the remaining three bytes which they allocate on their assembly lines.

If a packet is intended for your computer, the MAC layer in the controller chip will examine it to see if the *address* is the same as yours.

If so, it will be placed in a ram buffer and your CPU will be interrupted to be told that some data has been sent to it.

Why is data placed in dedicated buffers rather than straight into the computer's memory?

Well, Econet actually does do this: As each byte arrives, the processor reads it from the Econet controller chip and places it in memory. The processor can keep up

Installation expertise

Like Econet, Ethernet is a bus network. That is, a single data route is simultaneously connected to all computers on the network. Irrespective of how many connections or cables are used, data on the network is available to all the computers virtually simultaneously.

Ethernet is now widely installed, particularly in business installations. It is so pervasive that it may be quite tempting to install a network without professional advice.

Those who genuinely understand Ethernet requirements will have few problems designing a reliable network but anyone who is unsure on any aspect of an installation should take professional advice.

The wide variety of installation options may well mean that a particular decision was made for one network that would be wholly inappropriate for another.

It is a waste of money to buy features you don't need but a potential waste of much more money is to buy system components that either do not take account of IEEE802.3 or are used incorrectly.

with the rate at which data is received – or transmitted.

This means that the processor can do very little else while Econet data is being transferred but so long as the file size is small, the computer will not be tied up for too long. But big files use up a lot of computing time.

Ethernet – at 10Mbit per second – will assemble over one byte per microsecond and would use virtually all the computer's processing time and the machine would be very slow – remember it doesn't just receive its own packets, it also gets those for other machines.

Even worse, there is the chance that some data might be lost if the

software couldn't *keep up*. By assembling packets into independent buffer memory no computer time at all is taken in receiving – or transmitting – data.

True, the buffers do have to be transferred to or from main memory for use by the Logical Link Layer, but at this stage the data will need little further processing and can be copied extremely efficiently.

Computing time is taken up by handling the communication protocols between each of the software layers. It is possible to transfer data and bypass them but doing so will usually make the resultant network incompatible with other standard protocols like

Computer considerations

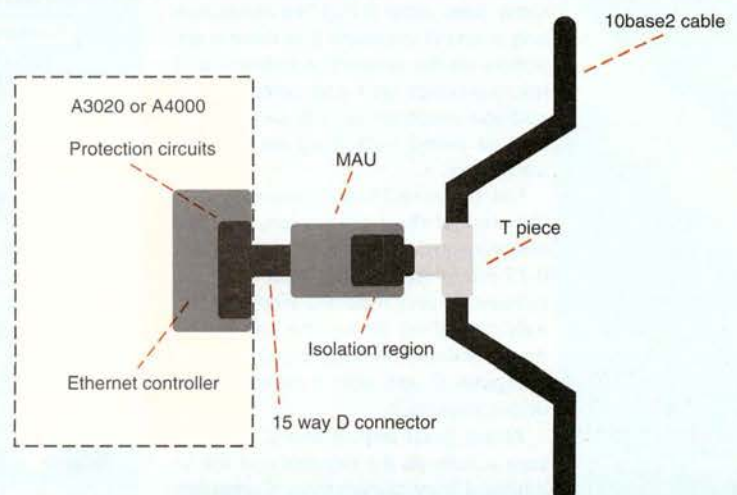
Low cost Ethernet for Acorn computers is a by-product of the huge volumes of components being manufactured for business computers. However it's not enough to design the Acorn-specific Ethernet interface the same as the business one.

For example, the A3020 and A4000 have a single 15-way D-type connector for network use.

Ethernet shouldn't be connected to this for several reasons: No IEEE802.3 wiring scheme specifies direct connection to this type of socket. The electrical characteristics of the connector and those of the computer's circuit board do not comply to IEEE802.3 rules, and neither the A3020 or the A4000 are designed to allow IEEE802.3 electrical isolation requirements.

For an Ethernet interface for Acorn machines to comply with IEEE802.3 it's necessary to have an external unit connected to the actual network wiring to provide the required electrical characteristics which then connects to the 15-way plug and into the computer itself.

This design is, in fact, far better because different external units can then be used for the different types of network cabling and network software can be arranged to identify what it's actually connected to.



It is so important that all computers on the networks use formats which are either the same or at least co-exist

➤ AUN. Once acceptable overall transfer speeds have been attained absolute speed should **not** be the main criterion for choosing a network – reliability and compatibility are more important and it is worth trading some speed to achieve these ends.

There is no point in getting high

transfer rates if you have to keep re-sending data due to errors creeping in.

High data rates achieved at the expense of compatibility will restrict your choice of suppliers and limit future network growth.

● *Next month we'll look at the whole stack of software layers, why they are there and what options they give you.*

What's on offer

The author is MD of i³ (0223 413717) who offer a low-cost consultancy service, and initial faxed enquiries are answered free of charge. They supply Ethernet hardware for 10BaseT and 10Base2 for the A3020, A4000 both at £127 and A3000, A5000 at £115.

Bus Architecture and CSMA/CD

With the exception of some very large networks, irrespective of the use of 10base5, 10base2 or 10baseT, all computers in an Ethernet installation are effectively simultaneously connected to each other. What determines when a computer can and cannot transmit data on the cable? IEEE802.3 defines the CSMA/CD protocol which handles this problem.

In the MAU (Media Access Unit) each computer senses if the network is currently quiet (called *carrier sense* – CS). If so, all those who wish to transmit will try to do so (called *multiple access* – MA).

After sufficient time has elapsed for the electrical signals to travel the length of the network, each MAU will be able to determine if more than one computer has tried to transmit at the same time and so the data has *collided* (called *collision detect* – CD).

After a collision each transmitter will wait a random length of time and then try again. As the random delays will be different, one will try sooner than the others and so succeed in gaining the use of the cable.

This is illustrated here. Computers A and D will attempt to transmit at the same time. After 0.025 micro-seconds only A and D are aware that there is any activity on the network. A further 0.051 micro-seconds later and computer B's collision sense circuit will detect data and so avoid switching on its own transmitter.

Just before 0.25 micro-seconds after the start of the transmission, the two transmissions are about to collide. After 0.25 micro-seconds the data will have collided leaving modified electrical signals travelling along the cable. 0.4 micro-seconds will see the collision pass computer C and after 0.46 micro-seconds computer B.

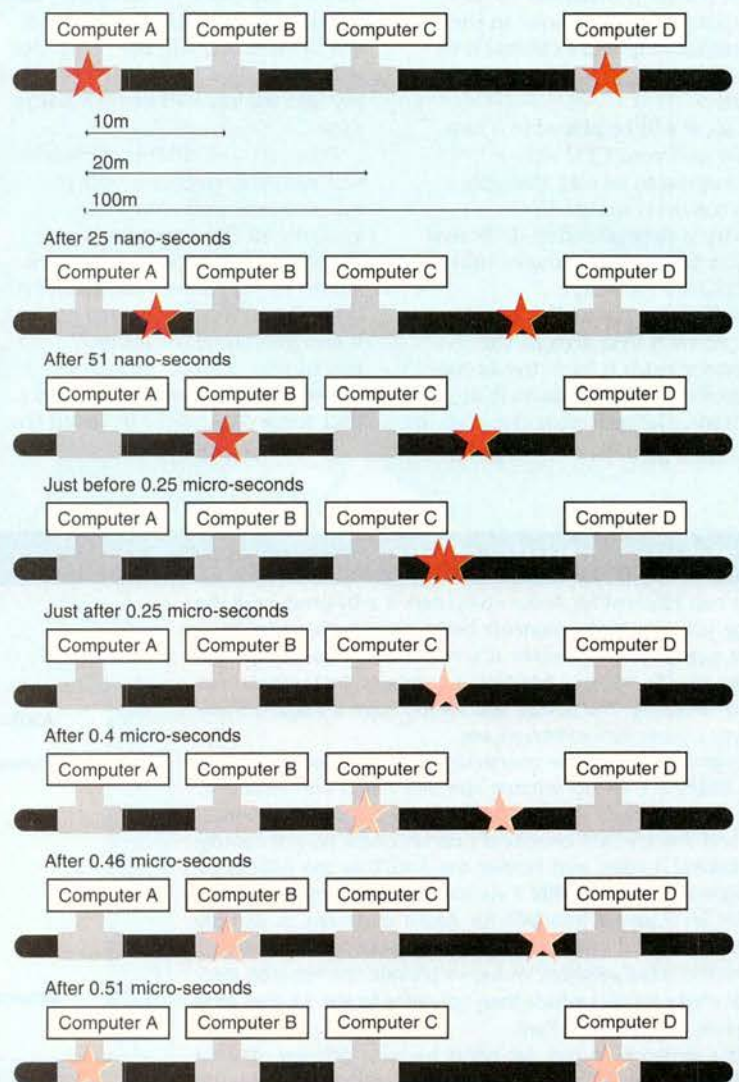
At this point both B and C will have seen activity on the network and will be inhibited from transmitting. Computers A and D will be unaware that their trans-

missions have collided. It is not until 0.5 micro-seconds after the original transmission that A and D are aware that their transmissions have failed.

Each will now wait a random period before trying again. Delays built into the

Ethernet interface electronics allow sufficient time for any collisions to occur and be detected.

A badly designed installation could defeat the collision mechanisms and cause unreliability.



● The problem of clashing packets on a network

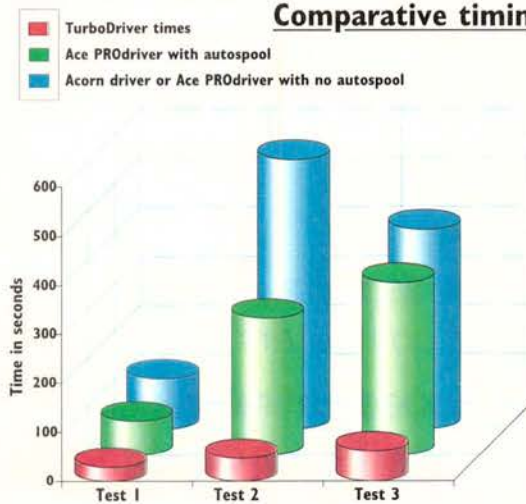
The range of TurboDrivers has expanded to include versions for the Hewlett-Packard DeskJet and LaserJet range of printers, as well as the Canon bubblejet range. The latest release 3 versions are now fully RISC OS 3.1 compliant, offer new advanced features and are faster than ever before.

The bottom line is that if you value your time, the TurboDrivers are for you - they can render pages and give control back typically at between three and ten times faster than Acorn printer drivers or Ace PRODrivers. Indeed once the image has been rendered then the printing continues entirely in the background - as fast as the printer will go. This makes a large difference for just one page and an enormous difference if you are printing more than one copy of each page.

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RISC OS 3 Turbo D R I V E R S

Comparative timings



Test1 - A single DTP page of text and scanned graphic images

Test2 - Two copies of a three page text and graphic document

Test3 - A complex full page of graphics from ArtWorks.

The timings indicate the time in seconds to get control back. All tests performed on HP DeskJet 500 printer using a 4Mbyte A440 with an ARM3 fitted. Other machine combinations show similar performance gains.



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F.R.E.D. ...a.o.k?

FRUSTRATINGLY restrictive, emphatically dismal? Whatever F.R.E.D. stands for as an acronym, as a game it's an exercise in hair pulling and keyboard belting. The basic plot casts you as Malcolm Maltezer, your average corner shop chocolate confection, happy to roll around your box, until one day, you're turned into a human being.

Frightening isn't it, though it's a pity that the reverse doesn't happen – I can think of plenty of people I'd like to turn into chocolate sweets on a hot summer day.

Anyway Malcolm's best friend is a loony professor, presumably a lemon bon-bon or something similar, and he's designed a F.R.E.D. spacesuit. Wearing the suit – and now in human form – Malcolm must redirect a giant laser beam by using mirrors, while collecting bonus power stars by head-butting special squares. How many? Ah well, enough so that you don't get the *you haven't collected enough* message.

Clear on that? I thought not. Needless to say not only is the plot pretty juvenile as opposed to plain silly, the objective has little to do with it either. Still, it's enough to know that there's this laser and when a timer runs out it's going to fire and that's your lot.

There are reflecting mirrors, the angle of which you can alter by pressing the right key when you pass over them and the aim is to direct the laser fire around the screen until it reaches a destination block.

In the meantime there are little animal and unfriendly object-types scurrying around the screen and contact with

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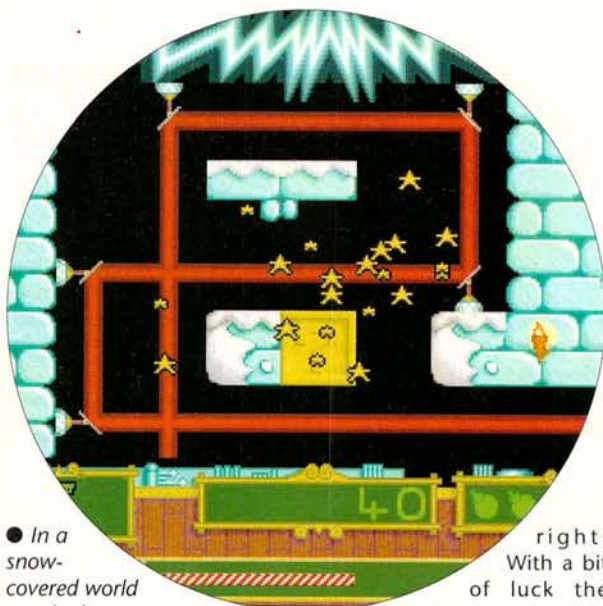
them is painful and ultimately fatal.

To counter the threat of these there are bombs on later levels that you can collect and leave lying around in waste paper bins, or simply in the way. What's confusing the first time round is that you can successfully direct the laser fire to its destination and still lose your life.

Ah you think, I've got to be waiting at the exit door as well, ready to leave the screen when it fires and then you die again through lack of laser power. Sorry? Yup, you've also got to collect bonus power stars by head-butting special squares. How many? Ah well, enough so that you don't get the *you haven't collected enough* message.

I must admit it took three days before I completed the first level, but that was mainly because the final mirror you have to switch over is located in the air just underneath an overhang. Time after time I leapt at it and frantically pressed the switch key to no effect.

Round the screen you go for your next attempt, and another couple of fruitless jumps later a squeaky voice announces that your game is over. The tactic to use, is to hold down the switch key, jump at the mirror while moving right, and then press the left key as you go over it so that you stop going to the



● In a snow-covered world get the lasers direction wrong and you'll end up as a pile of stars

right. With a bit of luck the mirror switches and

you can continue.

Where the game gets tricky is in providing one way passages and obscuring where the laser goes. Plus you get more frenzied activity, the already scarce time limit gets shorter and life gets much harder in general.

What basically saves F.R.E.D. from being consigned to the bin is that while you only get one life, you also get the code word for each level you complete. Good job too since it's a pretty hard game all round.

The music is quite funky but when you get stuck it can become quite irritating. Thankfully you can turn it off, as well as the sound effects for late night gaming.

F.R.E.D. is hard, there are no two ways about it, but it's quite slick and smooth and the graphics are decent enough for a platform game.

If you fancy a real challenge this will certainly give you one, but you may find that a younger relative will be much more adept and be playing long after you've given up.

Duncan Evans



● Meet Malcolm Maltezer, your guide and hero in an alien landscape



● Wearing the F.R.E.D. suit, redirect a giant laser and make a safe exit

KillerBugs

...defend or die

● A swarm of bad guys to test your reflexes to the full

MY favourite so far in Cambridge Software's Arcade Classic Range, this is a must for all oldies who long for the good old days of space invaders and limited options. There are only two choices in KillerBugs – kill or be killed.

This is nothing more than a shoot-

everything-in-sight and it is a perfect way of spending several meaningless hours which will leave you frustration free and ready for anything.

It is easy to play and with little effort you can find yourself on the high score table and on level 10.

But don't feel too complacent, there are 255 levels and if your fingers survive that long, just spare a thought for your keyboard which will be well bashed by then. CIS are planning a joystick supported version in the near future.

The plot consists of a sad tale of envious space-bugs intent on stealing everything in sight. These highly prized objects are ranged on the right of the screen and take the form of anything from cherries to disks and chicken legs.

You are all that stands in their way and with three ships – GJL Starfighters to be precise – a shield and a fast trigger finger poised on the missile launcher. Extra ships will appear after 15,000 points but if the bugs get all the objects it's game over.

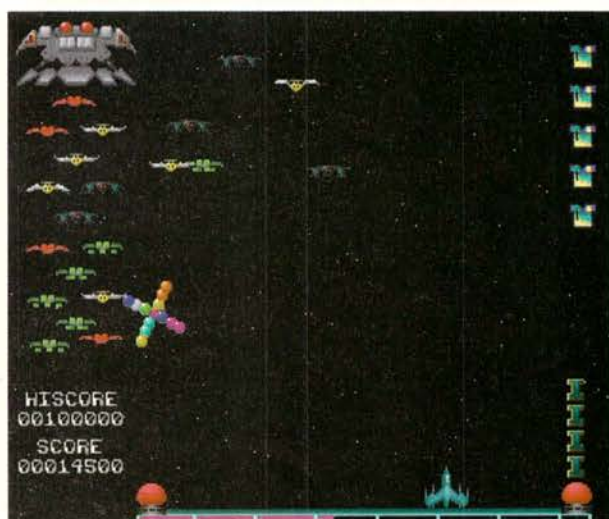
The gameplay may be simple but

Gerard Vermeulen and David Raven have done an excellent job. The graphics are stylish, well detailed and ever so smooth with slow wing movements from the bugs as they fly in formation from the mothership.

Other creatures follow different flight patterns so a bit of strategy works to your advantage as does your shield. The Landers simply fire at you but watch out for the devious acid-dropping segmented centipedes. The Bouncers appear initially as rotating four-spoked wheels to wreak havoc whatever your tactics.

KillerBugs aims to be fast moving, fun and value for money as well as nice to look at. It succeeds in all of these bar one, the cost.

Pam Turnbull



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Humanoids & Robotix

...a classic date?

ONE of the major problems with launching a Classics range is that often the games that thrilled 10 years ago now look old, pixelated and have feature-dated gameplay.

I am in two minds about this Arcade Classic, although with two games on the one disk it is better value. First impressions are of magazine listing-style graphics and simple gameplay. But this is what

the arcade machines featured in the early days and at the time we were stunned and impressed – dear me how the memory adds a rose-coloured view.

What we have here are two games which are true to the originals and are worth adding to a collection just to see how our expectations have risen. But are they any good to play?

Humanoids is *Defender* pure and simple. As well as destroying the pre-requisite aliens you must catch the captured humans and place them back on the ground which means some tricky control with lots of keys for different effects. Fail and enemy mutation and destruction of the world as we know it are sure to occur.

The second game is *Robotix* and there were many of this sort written by commercial companies and amateurs alike (I even wrote one, Ed). You are on foot and your job is to pick up the helpless humans while shooting the enemy and avoiding curious assorted nasties which refuse to lie down and die. You may be a robot yourself but life is still precious.

Speed is of the essence in *Robotix* as with the destruction of one selection of bad guys, another even faster moving



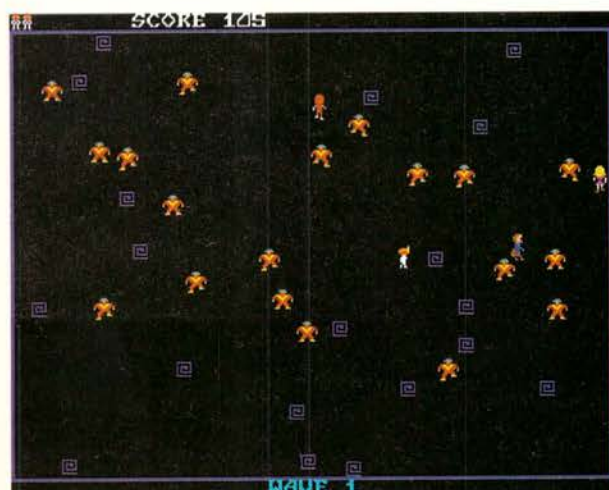
● Simple graphics and dated gameplay or a true classic?

bunch will aim to finish you off. Some advice: Don't get boxed in.

From a historical point of view the games are interesting and will keep you amused for a couple of hours. For my money I'd opt for a compilation of four not so old challenges.

Pam Turnbull

● Protect and survive, but Robotix does lack a certain depth



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Demon's Lair

A brilliantly original isometric arcade adventure.



For centuries the land of Kaxiyo has been ruled by a friendly Dragon. Recently an evil Demon has captured the Dragon and imprisoned him in chains. You and the people of Kaxiyo are being terrorised by ghosts and other fiends making it deadly to go outside.

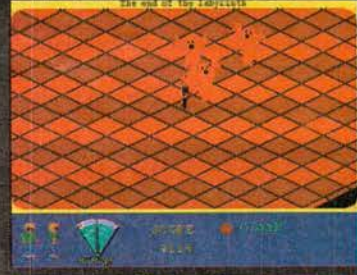
Food was running low so someone had to be chosen to destroy the Demon. The people chose their bravest and strongest warrior but he was soon killed, sapped of all life by the ghosts. Nobody dared go so it came down to drawing straws and you got the short one.

The quest beckons – find your way around the lair, solve the many problems (there are clues in these screenshots), meet the varied characters that await you, free the Dragon (he'll be pleased) and finally kill the Demon. You'll be the hero of the century if you succeed and ghostfood if you fail.

It's a game for all the family yet will challenge adventure enthusiasts – with entertaining animated characters, lots of tricky but logical puzzles and some good arcade action, the Demon's Lair is a superb game that will provide many hours of fun.

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Virtual Golf

... really something

FOR as long as there have been home computers, someone has produced a golf game for them. Back in the mists of time the typical offering was either a top-down, plan-view or – as with one particular BBC B game – a side view of the hole.

That was a novelty when it appeared. But when Leaderboard, the grand-daddy of modern golf games, first appeared in 1986, it changed the way things were presented forever – 3-D had become a reality.

Of course, now all golf sims are 3-D and in the case of Virtual Golf there is a real course, a very nicely animated player plus digitised trees to add to the realism. That, according to the 4th Dimension, makes it virtual reality golf. Maybe, though once you look past the digitised trees and handsome player, the course is still polygons.

Virtual Golf has been designed to use extra courses, so you needn't worry about being trapped on the one supplied. Using a rather clever method, the program loads to the iconbar and accesses the courses it can see semi-automatically. There are two optional screen modes, normal and VGA, which makes a stunning difference to the quality.

Before you get going on the course you can either set up your player or alter any of the numerous variables involved. You can also have four human players on the go, which makes the game considerably more enjoyable.

However, for the solitary player, this isn't just a case of tediously plodding around a single course. You start off with a handicap of 28 and by going round a few times hope to get that down low enough so that you can start entering

● Now just tap it in the hole



tournaments like the Beginners Knockabout Cup.

An inauspicious start, but hey, Nick Faldo didn't start at Wentworth you know. Anyway, all this not only adds interest in the short term but you have an objective for some long-term gameplay. This is what other golf games have sadly failed to address. In a nutshell, if you keep practising you should get further and further into it.

Whether you do or not largely depends on whether you can come to terms with the control system. Once out on

the course your caddy suggests a club, but it's down to you to change it if it isn't going to do the job.

Before you hit the ball there's a seemingly pointless bit where you click once to go into practice swing mode and then click again to set up for the actual shot. Most of the time you'll want to wack the ball as hard as possible but because of Virtual Golf's unique control system you may well want to practise the speed of stroke when you get close in. That's where the fun really starts.

Eschewing traditional methods of timing moving bars and pointers, Virtual Golf requires you to lash the mouse from right to left to hit the ball, with any up or down vagary being translated into hook or slice.

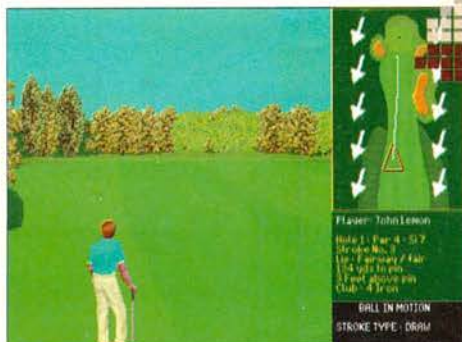
The trouble is that if you lash too quickly nothing happens, whereas if you do it almost as quick, the golfer hits the ball, but nowhere near as far as he should. Try as I might I only once hit a driver 200 yards. Virtually all my shots managed 65 per cent of the distance they should have achieved. However, others have done better so it is possible – perhaps I need to practise more.

The problem when getting to the greens is slightly different. It can be difficult to get the amount of necessary strength right, it's not very easy to read the greens and they often have a big ridge or dip in them. But then who wants a dead easy game?

Virtual Golf is certainly fun for a couple of players, because you all have the same problems.

If you can master that mouse stroke the design is good enough to keep you entertained for some time, especially with the promised release of other courses in the future.

Duncan Evans



● You have all the information you need for your shot



● The caddy suggests a chip shot over to the pin



● Decisions, decisions – under or over the trees? Choose your club

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...BBC Acorn User (May 93)

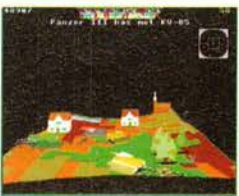
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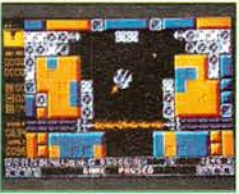
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AIR SUPREMACY

In this unique game, you can swap between air and ground/sea forces as the battle develops. Practise with the biplanes and tanks of 1918 Europe, the fighters and gunboats of the Pacific 1944, and the guided missile jets and desert tanks of the Gulf 1991. Then to 2150 and the final challenge!

"The sense of speed when flying around is excellent. Skimming along the ground in a stealth fighter is particularly fun."

...BBC Acorn User (Dec. 91)

"The ultimate dogfighting game - will take weeks of intensive play to complete - sinks its hooks into you and doesn't let go."

...Archimedes World (Dec. 91)

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Give your computer a voice with this high quality speech synthesiser, which is both easy to use and very flexible. It can directly speak words you input or text files, or you can use phonetic input to add stress/intonation, speak foreign languages or even sing! An easily modified spelling program is included.

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EGO: REPTON 4

Ego, the wisest of all the Repton family, now presents the cleverest and most puzzling of all the Repton games. There are a massive thirty levels of play. In each level you have to build up a jigsaw puzzle of a famous personality or place by collecting the pieces scattered around.

However, it's not quite that easy! You have to carefully manoeuvre your way around using various Conveyers and Transporters, and a lot of cunning strategy. You collect the Gems as you move around, whilst dodging the deadly Androids, but what do you do with the Towers, Trees, Grass, Mushrooms and Holes?

"Repton 4 is challenging, good value for money and well graded. What more can I say?"

...Acorn Computing (Jan. 93)

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SUPERIOR GOLF

The complete golfing game for 1 to 4 players, designed exclusively for the ARCHIMEDES. Realistic gameplay with a choice of six courses (St Andrews, The Belfry, Victoria and three Sea Palms courses), plus Driving Range and Practice Green. Full feature hole and course design and editing facilities.

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THE LAST NINJA

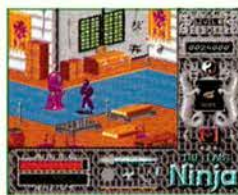
You must use swords, nunchakus and shiraken stars and solve many devious puzzles in over 140 action-packed screens. From the dangerous wastelands and magnificent gardens, to the direst dungeons and the final confrontation in the Inner Sanctum of the Shogun's palace. You cannot fail...you are The Last Ninja.

A graphically brilliant conversion, using the full screen and 256 colours, of one of the most popular and highly rated games ever produced for home computers.

"There's a great big nasty at the end of each level. The solution is never a matter of fighting, it always requires some astute thinking. The Last Ninja is a great game - go silently and leave no witnesses."

...Micro User (Aug. 92)

£24.95 (inc VAT)



MASTER BREAK

A snooker-style trivia quiz for 1 to 4 players. Over 2000 questions on SCIENCE & NATURE, POP MUSIC, GEOGRAPHY, SPORTS & PASTIMES, ARTS and HISTORY. Digitised pictures include: sport and pop stars, famous places, animals and world leaders. Amusing and educational. Can you get the maximum break of 147?

£19.95 (inc VAT)



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of Experience

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Scan256 gives you up to 256 levels of grey at a maximum of 400dpi and is supported by state-of-the-art sophisticated software - for only £159. This makes it the only sensible scanning and image processing solution for the Acorn 32-bit range. Just compare these features:

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Please specify Archimedes type, not compatible with A3010, A3020, A4000.

£159

- Scan256 for A3000 Micro £169

A3010 DTP Pack

Supplied with 3.5" Floppy Disc Drive and a mouse, Colour Monitor and lead, TV modulator, 30Mb fast IDE Hard Disk Drive, 'Compression' utility to increase the Hard Drive capacity to typically 60Mb, the highly acclaimed Computer Concept's Impression Junior DTP package, EasiWord wordprocessor, Quest for Gold game, applications suite of software packages and comprehensive audio training tape.

RRP: £1095

Sale Offer Price: £775

- A3010 DTP Pack with Learning Curve £875
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Special Education discounts available on micros, RAM upgrades, ARM 3 Turbo Card, etc. Please write in or telephone:

0582 74 55 55

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All our memory upgrades are simple to fit. No soldering required. Fitting instructions supplied.

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Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine.

A powerful security feature has been provided with the two unique commands *IDELOCK and *IDEUNLOCK, ideal for educational establishments where hacking or tampering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The *IDEFORM Write Protect option is particularly useful in conjunction with *IDELOCK as it will prevent any unauthorised deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- IDEFORM, WIMP based configuration and formatting software
- Drives can be individually write protected
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- IDEFSDisk, creates PC emulator hard discs

A300/A400 Internal IDE Drive

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	£189
ADA 0550	80Mb	17mS	£239
ADA 0530	100Mb	16mS	£259
ADA 0570	200Mb	15mS	£369
ADA 0880	330Mb	15mS	£599

All above 3.5" Drives are supplied complete with Controller Card & cable for use with A300/A400/A500 series machines.

AAA 0300 External Case & PSU for A3000	£85
AEA 1060 Archi IDE Hard Disc Podule only	£89

A5000 Internal IDE Drive

ADA 1030	80Mb	17mS	£189
ADA 0940	100Mb	16mS	£195
ADA 0950	200Mb	15mS	£275
ADA 0580	330Mb	15mS	£525

A5000 2nd Internal IDE Hard Drive

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ADA 0960	100Mb	16mS	£205
ADA 0970	200Mb	15mS	£285
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A3000 External IDE Drives

ADA 0780	44Mb	28mS	£254
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Internal Hard Disc Drives for A3000/A3010

State of the art, 4 layer internal IDE Hard Cards for the A3000. Software supplied in, On-board ROM.

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Supplied ready assembled. No soldering required. Simply plug into the allotted space.

Archi IDE Hard Cards

"Simply plug
and play"



Watford's easy to instal, low cost, high performance, revolutionary IDE Hard Cards for the A300 & A400 series Archimedes.

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(All above Hard Cards can be used as Removable Hard Drives. Ideal for Military and Education use.)

Archi to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.

- Risc OS 2 Version £15
 - Risc OS 3 Version £16
- (P.S. For A3000 Serial Upgrade (£19) required)

A3000 Accessories

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- A3000 Dust Cover £5
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- A3000 External Podule Case £15
- Monitor Stand £15
- Serial Upgrade £19
- Micro+monitor cover £9

A3000 I/O Card (User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analog to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

Features

- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.
- An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices. £38

Cortian CKAI Interface

Eliminates need to have a User port in A3000/305/310/400/540 when using Concept Keyboard. £28

Concept Keyboards

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(Please telephone 0582 74 55 55 for details)

Archimedes External Disc Drive Interface

With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Up to 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead.

Price £21

Back Plate Extension

- A300/400 £15;
- A3000 £14

ARM 3 Turbo Card MkII

Simply The Best



Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £145. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.

Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £24.

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

RRP £249

Special Offer £125

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ShareHolder Pro	£129	Payroll Manager	£66

TEX EPROM ERASERS

Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast.

- **ERASER GT** - Deluxe version erases up to 8 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£36**
- **Spare UV tubes.** **£12**

Archi Real-Time Digitiser



Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air television signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £75

A Set of Colour Filters for colour image grabbing using a video camera **£16**

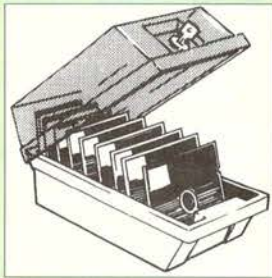
Vision Digitiser

Working in real time, the Vision Digitiser is available in either monochrome or colour versions with a software upgrade to colour. Create high quality images simply by connecting the digitiser to a PAL video source, such as a camcorder, video or digital camera. Includes powerful RISC OS software.

Mono Vision Digitiser £44.00

Colour Vision Digitiser £74.00

Antistatic Lockable Disc Storage Units



- **M35** – holds up to 50 5.25" discs £4.95
- **M85** – holds up to 95 5.25" discs £6.95
- **M25*** – holds up to 25 3.5" discs £4.95
- **M50** – holds 50 3.5" discs £6.50
- **M100** – holds 100 3.5" discs £6.99
- **M10** – holds 8 of No. 10 Data Cartridges £15

* Not lockable

Disc Plonker Rack

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.



£2

3M – Diskettes

Lifetime warranty on 3M Discs

- 10 x 5.25" S/S D/D 40T (744) £5
- 10 x 5.25" D/S D/D 40T (745) £5
- 10 x 5.25" S/S D/D 80 Track (746) £6
- 10 x 5.25" D/S D/D 80 Track (747) £7
- 10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT £8
- 10 x 3.5" S/S D/D 40/80 Track £6
- 10 x 3.5" D/S D/D 40/80 Track £6
- 10 x 3.5" Double Sided High Density £10

Top Quality Diskettes

Watford's life time guaranteed disc are supplied complete with self stick labels & plastic library case.

- 10 x **M3** 3.5" D/S D/D 80 Track £6
- 10 x **M9** 3.5" D/S High Density £10
- 10 x **M4** 5.25" S/S D/D 40 Track £5
- 10 x **M5** 5.25" D/S D/D 40 Track £5
- 10 x **M7** 5.25" D/S D/D 80 Track £6
- 10 x **M8** 5.25" D/S H/D Hi-Density £9

Special Bulk Offer Discs

(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S/S 40T	D/S 40T	D/S 80T
• Without Sleeves 5.25"	£25	£30	£35
• With Sleeves 5.25"	£28	£33	£38
• 3.5" D/S D/D	£21 for 50	£39 for 100	
• 3.5" D/S H/D	£40 for 50	£75 for 100	

Disc Drive Power Leads

Supply from BBC power supply to standard Disc Drive Connection: Single £3.00; Dual £3.75

Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable
Single £4 Twin £6

3.5" Disc Drive



These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
• CLS35:	Single Disc Drive, 400K	£59
• CLD35:	Twin Disc Drives, 800K	£109
	Disc Drive with PSU	
• CS35:	Single Disc Drive, 400K	£82
• CD35:	Twin Disc Drives, 800K	£126

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drives in Monitor Stand



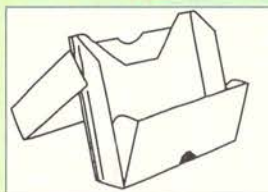
- **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£150

- **DP35 800** – Same as above except, one disc drive is a 5.25" and the other is 3.5".

£145

Plastic Library Cases



- DLC1** – Holds 5 x 3.5" Discs. £1.50
- DLC2** – Holds 10 x 3.5" Discs. £1.90
- DLC3** – Holds 5 x 5.25" Discs. £1.60
- DLC4** – Holds 10 x 5.25" Discs. £2.00

Disc Albums

Attractively finished in leather-look PVC Vinyl

- DW1** – Holds 6 x 3.5" Discs £2.50
- DW2** – Holds 6 x 5.25" Discs £3.00
- DW3** – Holds 20 x 5.25" Discs £3.50
- DW4** – Holds 40 x 3.5" Discs or 5.25" Discs £4.50

Cleaning Kits

- 5.25" Disc Cleaning Kit £4
- 3.5" Disc Cleaning Kit £4
- PC Cleaning Kit £7
- Professional PC Cleaning Kit £12
- Aerosol Dust Spray Can £3
- Servisol Foam Cleaner Can £3
- Antistatic Aerosol Spray £3

Acorn & Watford DFSs

- Watford sophisticated DFS ROM £16.00
- Watford DFS Kit complete £49.00
- DFS Manual (comprehensive) £6.95
- Acorn DNFS ROM £17.00
- Acorn ADFS ROM only £25.00
- Acorn 1772 DFS ROM Kit £49.00
- Acorn DFS Kit complete £48

Watford's MkII 1772

Single/Double Density DFS

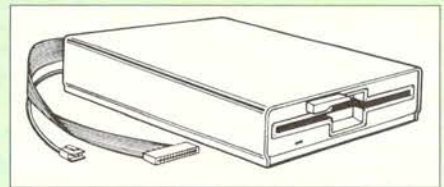
Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1772 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1772 DFS, plus many more added features.

- Complete Kit Special Price £44
- DDFS Manual (No VAT) £6.95

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted. Follow the trend with a Watford plinth. (Turn to the 6th page of our advert for the Plinths). P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"



Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
• CLS400S:	Single, 40/80 track 400K Double sided Drive	£75
• CLD800S:	Twin, 40/80 track, 800K Double sided Drives	£138
	Disc Drive with PSU	
• CS400S:	Single, 40/80 track, 400K Double sided Drive	£85
• CD800S:	Twin, 40/80 track, 800K Double sided Drives	£149

Credit Card Hotline:
0582 74 55 55

Continued → → → → → → → →

Microvitec Monitors

- 1431 - Standard Resolution #£175
 - 1451 - Medium Resolution #£215
 - Cub3000 Medium Res for A3000 #£195
 - Dust Cover for Microvitecs £5.50
 - Touchtec 501 Touch Screen £239
- # 3 years parts & labour warranty

Multiscan Monitors

Eizo T240i	£483	Panasonic C1381	£199
Eizo F340i-W	£625	C1381LR	£270
Eizo F550i-W	£899	Taxan 787	£215
Eizo T560IT	£1345	Taxan 787LR	£239
Eizo F560i-W	£1195	Taxan 789LR	£289
Eizo T660i-T20*	£1899	Taxan 795-PC	£465
NEC 2A-N	£274	Taxan 875+ LR	£739
NEC 3FG	£360	Taxan1150	£1699
NEC 4FGe	£517	Taxan	
NEC 5FG	£877		
NEC 6FG	£1739	1095LR-20*	£1699

Panasonic monitors carry 2 years on-site maintenance warranty.

Aries AlphaScan Monitor

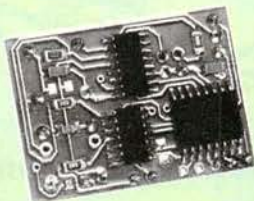
Its multiscan circuitry provides automatic adjustment for frequencies between 31 and 56KHz horizontal, and 43 and 70Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The VIDC Adaptor supplied with the monitor allows high resolution operation in all screen modes. £299

- Aries Alphascan 17" Plus £585

Philips Monitors

- BM7502 12" Hi-res Green £88
- CM8833 14" Med. Res Colour £195
- Dust Cover for Philips Monitors £6
- Spare Monitor Leads (various) £7

VIDC Enhancer



Our two unique VIDC add-on boards for the Archimedes cater for all VGA and Multiscan monitors and screen modes. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A Desk Top application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: Its unique design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control £35

MultiVideo VIDC Card: As above but for MultiScan monitors only. £19

Printer Leads

- BBC Centronics 4' £5; 6' £6
- Archi Parallel 2m £5; 5m £9; 10m £13
- PC Parallel 2m £5; 5m £9; 10m £13
- 25 pin D Male/Male 2m £5; 5m £10
- Centronics Double Ended 4' £5; 6' £6
- 5m £10; 10m £14
- RS232 Leads Various £POA

Integrex Ink Jet Printers

- Paper Roll for Integrex 132 £6.50
- BBC Screen Dump Software £10
- Colour Cartridge £23
- Black Cartridge £14
- 100 A4 OHP transparencies £55
- Colour Jet 2000 £599
- Betajet Ink Jet Printer £185
- Betajet Cut Sheet Feeder £43
- Integrex Colourjet Series 2 £335
- Auto Sheet Feeder for Series 2 £45

Star Printers

Printer	CSF	Ribbon
LC15	£190	£135 £5
LC20	£102	£60 £4
LC100C	£126	£65 £9
LC24-15	£245	£135 £5
LC24-100	£143	£69 £5
LC24-20 Mk2	£175	£65 £5
LC24-200C	£214	£65 £12
LC200 C	£151	£65 £12
Star Jet	£169	£43 £16
XB24-200C	£324#	£80 £12
XB24-250C	£389#	£139 £12
ZA-200C	£260#	£89 £12
ZA-250C	£324#	£139 £12

Includes 12 months on-site warranty

- Black Ribbons for Colour Printers £5
- Serial 8K 1'face LC10/15/24/200 £52
- 32K Buffer LC/XB24-10; 15; 200 £52
- Star/Archi Colour Printer Driver £15

NEC Pinwriter Printers

Printer	CSF	Ribbon
P22Q	£181	£59 £6
P32	£235	£59 £6
P62	£320	£89 £8
P72	£395	£115 £8
P90	£577	£115 £8

- Jetmate J400 £169; ● Jetmate J800 £249

- Black Ribbons P20; P32 £6
- Ribbons P60/70/P90 Black £8; Colr £14
- P60/70 Colour Option Kit £59
- CSF for P20 £59; P60 £89; P70 £89

Panasonic Printers

Printer	CSF	Ribbon
KX-P1123	£126	£59 £6
KX-P1170	£98	£59 £6
KX-P1624	£264	£126 £8
KX-P1654	£330#	£126 £8
KX-P1695	£267	£126 £8
KX-P2123M	£144	£79 £8
KX-P2124	£215	£89 £8
KX-P2180M	£126	£79 £8
KX-P2624	£269#	£126 £8
KX-P2023		£POA

Includes 12 months on-site warranty

- Dustcover for 80 column printers £6
- Serial Interface for above Printers £46
- Black Ribbons for P1081, 1180, 1124 £6
- Brown, Blue or Red Ribbons for KX-P1081/1592/1595/1695 £9 each
- 32K Buffer for above Printers £16
- Colour Kit for KX-P2180; KX-P2123 and KX-P2124 £49

Laser Printers

- All Laser printers (excluding HP Lasers) include 12 Months On-Site maintenance
- Brother HL4-PS Postscript 4ppm £974
 - Brother HL6 - NEW - 6ppm £469
 - Brother HL10-PS 10ppm £1329
 - Brother HL10-DV 10ppm £1149
 - Brother HL10-DPS 10ppm £1445
 - Canon LBP4 LITE 4ppm £525
 - Canon LBP4+ 1.5M RAM 4ppm £644
 - Canon LBP-8 Plus IIIR 8ppm £1435
 - Canon LBP-8 IV 600DPI 8ppm £989
 - Epson EPL-5000 6ppm £472
 - Epson EPL-5200 - NEW - 6ppm £565
 - Epson EPL-7500 PS 6ppm £1139
 - Epson EPL8100 10ppm £920
 - Fujitsu VM600 5ppm £539
 - Fujitsu VM800 (Best Buy) 8ppm £535
 - Fujitsu VM600E 5ppm £POA
 - HP Laserjet IIISI 16ppm £POA
 - HP Laserjet IIISI PS 16ppm £2469
 - HP Laserjet 4 8ppm £1073
 - HP Laserjet 4L - NEW - 4ppm £499
 - HP Laserjet 4M PS 8ppm £1449
 - HP Laserjet 4si £2260
 - HP Laserjet 4Si MX 1200 DPI 16ppm £3385
 - NEC Silentwriter S62P PS 6ppm £995
 - NEC Silentwriter S102 6ppm £1075
 - NEC Silentwriter2 290 £1194
 - NEC Silentwriter 290P PS 8ppm £1469
 - OKI OL400E 4ppm £449
 - Panasonic KX-P4410 5ppm* £459
 - Panasonic KX-P4430 5ppm* £594
 - Panasonic KX-P4451 11ppm* £919
 - Panasonic KX-P4455 11ppm* £1294
 - Star LP-4 Post Script 4ppm £774
 - Star LS-5 5ppm £499
 - Star LS-5 EX (RISC Based) 5ppm £625
 - Star LS-5 TT True Type+Mac 5ppm £775
 - Star LP-8 Star (post)script 8ppm £1130
- *2 years on-site warranty
- HP Laserjet IIIP 3 years on-site £150
 - HP Laserjet IIISI 3 years on-site £450
 - HP Laserjet 4/4M 3 years on-site £170

Laser Toners

Canon 2, 3 & 4	£52	KX-P4420/50/55	£20
Canon LBP8-IV	£75	KX-P4410/30	£29
Epson GQ	£12	NEC SWriter	£84
EPL 40/41/4300	£55	HP II/D, III/D	£60
EPL 71/7500	£117	HP IIP, IIIP	£54
EPL 8100	£117	HP4/4M	£72
Qume Crystal(3)	£84	Laserjet 4L	£65
Star LP4	£52	OKI OL400/800	£18
Star LS5	£69	VM800 8K pages	£99
Canon 8/Star LP8	£59		

Laser RAM Upgrades

Type	1M	2M	4M
IIP; IIIP	£49	£80	£132
II & IID	£60	£96	£142
LJ4/4M	£-	£75	£175 8M/£279
EPL4100	-	£120	- 512K/£52
KX4420/50i	£59	£89	£149
NEC S62/S102	£99	£180	-
Star LBP	£139	£275	-

Jetpage Postscript Cartridge

- HP IIP/IIIP £225 ● IID & III £227

Various Add-Ons

- Laserjet Appletalk Interface £135
- HP Adobe Postscript+ Cartridge £359
- Pacific Page Postscript £259
- HP Premier Font Collection £28
- Laserjet Various Font C'tridges from £45
- HP Postscript Module for LJ4 £270
- Laserjet 4 Powered envelope feeder £199
- Jetdirect Ethernet Card for Laserjet IIISI/4/4Si £359
- 500 Sheet paper cassette (3rd Bin) £205
- HP IIP/IIIP Lower Cassette Tray £96
- Canon LBP-4 Lower Cassette Tray £96

Citizen Printers

120D+	£98	Swift 90C	£198
Swift 9X	£185	Swift 200	£178
PN-48	£189	Swift 240	£200
Swift 90	£139	Swift 240C	£212

2 years parts and labour warranty on all above Citizen Printers.

- Swift 24 Ribbons: Black £4 Colour £13
- Cut Sheet Feeder for 80 col. printers £75
- Citizen 120D Ribbons £3.50
- Archi Colour Printer Driver £15

Hewlett-Packard Printers

DJ500 colour	£355	Desk Jet 510	£245
DJ 550 Colour	£459	Desk Jet 1200C	£1045
DJ Portable	£199	Deskwriter 550C	£459
Deskwriter 500C	£349	PaintJet XL300+	£1765
Quiet Jet plus	£299	PaintJet XL300PS	£2620

+ Includes 12 months on-site warranty
3 years on-site maintenance available as follows:
DeskJet & DeskWriter mono £55
DeskJet & DeskWriter colour £65

- PaintJet Cartridge Black £15; Colour £23
- DJ Portable CSF £49; Carrying Case £49

Special Offer

When you purchase any Hewlett Packard printer from us, you qualify for the following software offers:

- Adobe Type Manager v2 £45
- Designworks Software pack at £39
- Lotus Organiser Software at £39

Desk Jet 500 Accessories

- Ink Cartridges Black £16; Colour £23
- High Capacity Ink Cartridges Black £21
- Ink Refill Double Pack (JetFill) £10
- Ink Refill High Capacity (JetFill) £16
- Deskjet Turbo Driver £39
- Archi - DJ550 Colour Printer Driver £15
- Epson FX Emulation Cart.(500 mono) £45
- IBM Proprinter Emulation Cartridge £59
- Wordperfect Cartridge £89
- DJ 500 Dust Covers £6
- 636G 50 x Transparencies A4 £40
- 636J 50 x Glossy Paper A4 (also XL) £40
- 630Z 50 x Cut Sheet Paper A4 £15

Plug In Font Cartridges for DJ 500

- 22706B - Prestige, Elite, Line Draw £55
- 22706C - Letter Gothic & HP Line Draw £56
- 22707P - Proprint Emulation Cartridges £57

HP PaintJet/XL Accessories

- 630P 200 Z-Fold paper 8.5 x 11 £14
- 630Q 50 Transparencies 8.5 x 11 £39
- 630S 50 Transparencies A4 £40
- 630Y 200 Cut Sheets 8.5 x 11 £14
- 631Y 200 Cut Sheets A4 £18

Fujitsu Printers

- B-100 InkJet - HP Deskjet compatible 300dpi, whisper-quiet & 6 resident fonts #£159
- B-200 InkJet - HP Desk Jet compatible 300dpi. Built in Cut Sheet Feeder. Optional 2nd Bin/Tractor available #£239
- DL-1150 Dot Matrix - 24 pin, 110 column Colour optional £209
- DL-1150colour Dot Matrix - 24 pin, 110 column With colour option £235
- DL1250 £309; ● DL4600 £799
- DL3600 £439; ● DL5800 £999
- Joywriter £249; ● DL1250 colr £344
- B-100 Cut Sheet Feeder £49
- B-200 2nd Bin Sheet Feeder £95
- B-200 Tractor Unit £65
- B-100/200 Ink Cartridges £14
- DL-1100 Colour Upgrade £39
- DL-1100 Ribbons Black £5 Colour £11

Epson Printers

Printer	CSF	Ribbon
EX1000C	£428	£6
FX870	£273	£4
FX1170	£339	£6
LQ100	£148	£4
LQ570+	£205	£4
LQ870	£359	£6
LQ1060	£585	£6
LQ1070	£310	£6
LQ1170	£434	£6
LQ2550	£673	£6
LX100	£116	£4
LX400	£94	£4
LX850+	£135	£4
LX1050	£203	£6
SQ870	£409	£23
SQ1170	£560	£23
SQ2550	£669	£23
Stylus 800	£244	£10

Epson RS232 Interface

Standard £28;	+8K Buffer £75
● LQ100 Tractor Feed	£29
● FX850/LQ800/850 Tractor Feed	£69
● FX/LQ1050 Tractor Feed	£85
● LQ2500/2550 Tractor Feed	£90
● Dustcovers for 80 col printers	£6

Canon Bubblejet Printers

Printer	CSF	2nd Bin	Ink Cart
BJ10EX	£156	£43	£16
BJ10SX	£169	£43	£16
BJ200	£249	—	£16
BJ230	£299	—	£16
BJ300*	£319	£88	£12
BJ330*	£369	£110	£12
BJC800C	£1299	—	£16

- BJ10EX/SX Jumbo Ink Refill pack (twice cartridge volume) £12
- Optional Battery pack for BJ10EX/SX £33
- * includes 12 months on site warranty

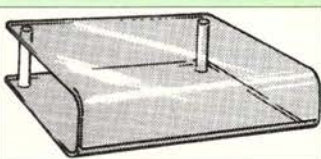
Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £16
132 Column version £25

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version £14
136 Column version £18



24-Hour Credit Card Order Line
(0923) 233383 or 250234

Universal Printer Sharers

Connect up to 4 Micros to 1 printer or 4 Printers to 1 Micro with our combined, Sharer/Changer switch boxes.

Standard Low Cost Sharers

Connects	Serial	Parallel
● 2 to 1	£10	£10
● 3 to 1	£14	£15
● 4 to 1	£19	£20

Professional Sharer Units

Connects	Serial	Parallel
● 2 to 1	£15	£16
● 3 to 1	£20	£23
● 4 to 1	£30	£34

Auto Printer Sharer Switch

Connects	Serial	Centronics
● 2 to 1	£34	£36
● 4 to 1	£52	£53
● 8 to 1	—	£85

256K Multi Spooler

These Parallel Auto printer sharer switches have built-in 256K Buffer.

● 2 In / 2 out	£125	● 4 In / 2 out	£139
● 8 In / 1 out	—	—	£185

(Cables for all printer switches are from £5 each please specify the type required when ordering.)

Compact Converter Unit

Serial to Parallel & Parallel to Serial £32

Listing Paper (Perforated)

● 1,000 Sheets 9.5" x 11" Fanfold	£7
● 2,000 Sheets 9.5" x 11" Fanfold	£11
● 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold	£21
● 1,000 Sheets 15" x 11" Fanfold	£9
● 2,000 Sheets 15" x 11" Fanfold	£16
● 1,000 Sheets true A4 Fanfold Paper 70gms	£11
● 2,000 Sheets true A4 Fanfold Paper 70gms	£21
● 500 Sheets A4 80gms Bond	£3.50

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Cross Over Manual Switch

2 In/2 Out Parallel	£29
2 In/2 Out Serial	£28
3 In/2 Out Serial	£36

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
BBC B/BBC Master	—	£6.00
Archimedes Micro pair	—	£9.00
Citizen 120D	£3.25	£6.00
EX800/1000	£6.00	£6.00
RX/FX80/85/800/MX80	£2.95	—
FX/MX/RX100/1000	£3.95	—
Kaga/Taxan KP810/815	£6.00	£6.00
LQ400/500/550/800/850	£5.50	£6.00
LQ1050/LQ2500	£12.00	£6.00
LX400/800/850	£3.50	£6.00
M1009/GLP	£2.95	£6.00
NEC P2200	£4.50	£6.00

Dust covers for most 80 column printers available at £6 each

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	£6.00
1,000 90 x 36mm (Twin Row)	£6.25
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.75

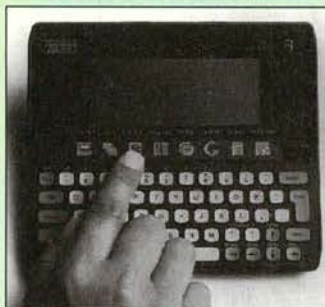
Laser Printer Labels on A4 Sheets

3750 - 70 x 29mm (3 Rows x 10)	£15.50
2400 - 70 x 37mm (3 Rows x 8)	£15.25

Listing Paper (Perforated)

● 1,000 Sheets 9.5" x 11" Fanfold	£7
● 2,000 Sheets 9.5" x 11" Fanfold	£11
● 1,000 Sheets 9.5" x 11" NCR 2 Part	£21
● 1,000 Sheets 15" x 11" Fanfold	£9
● 2,000 Sheets 15" x 11" Fanfold	£16
● 1,000 Sheets true A4 Fanfold 70gms	£11
● 2,000 A4 Fanfold Paper	£19
● 500 Sheets A4 80gms Bond	£3.50

Pision Series III



Pision Series III Computer

● Series 3 128K	£155
● Series 3 256K	£179

RAM Solid State Discs (SSD)

● 128K	£68
● 512K	£170
● 1Mb	£255

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● 256K	£59
● 512K	£102
● 1Mb	£170
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● RS 232 Serial Link for PC	£58
● RS 232 Serial Link for Mac	£59

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Voltmace Joystick

Delta 3B Single Joystick	£10
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Delta 14B Single Joystick	£11
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24
Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128	£25

Commander Joystick

Features:

- Direct connection to BBC Analogue input port -
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- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Price: £15

Beeb PC (BASIC)

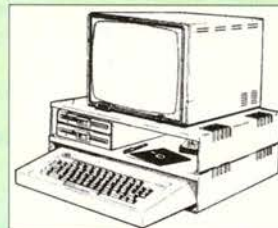
Designed for program authors to convert BBC programs to run on IBM PCs.

Price: £38

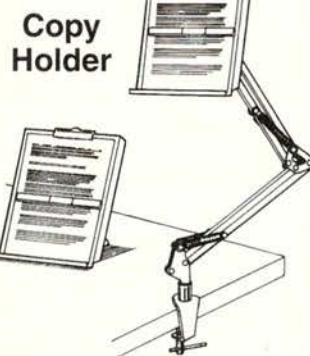
Plotters

● DXY1100	£650	● DXY1200	£835
● DXY1300	£1049	● Sketchmate A4	£349
● Sketchmate A3	£495	—	—
● Roland Plotter Fibre Tip Pens	£7.50	—	—
● HP7440AU	£665	● HP7475AU	£899
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- Double 490 x 310 x 210mm £27
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- Quest Mouse III & Quest Paint £39
- Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont £59
- Quest Mouse III only £25
- Quest Paint Software only £23
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Conquest (Quest Paint Extension) ROM £24
- Quest Colour Dump Disc - This new software allows you to print direct from Quest Paint to your Integrex Colour Printer £18 (P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

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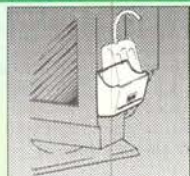
Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes. £15

Mk III AMX MOUSE

- **AMX Mouse plus Super Art** £39 (Please specify for BBC, Master or Compact)
- **AMX MOUSE ONLY** £25
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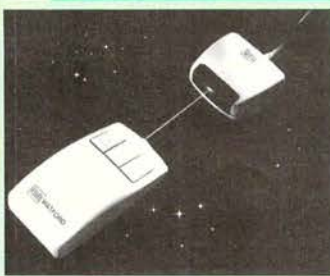
WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive etc.

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Features

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- QT-10 BBC/Master Version £25
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Archi Mk II Hand Scanner

Watford's Mk II hand scanner has a maximum resolution of 400 dpi. The scanning width is 4". The sophisticated software is supplied in a 64K ROM, located on a standard single width expansion module. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. Other facilities include Cropping and scaling to any size including stretching and squashing in X and Y directions separately. Colour tinting. X and Y flip. Edge detection which turns solid objects into outlines. Images can be printed on any printer supported by RISC OS. On-screen help is provided via the RiscOS interactive help facility. (Please write in for full technical details).

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- AHS-3 Archi A3000 Version £99

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- Wapping Editor Software Pack £39
- Wapping Editor plus Mouse £59

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc. Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out. £15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor. Also included are two Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines. Supplied complete with instructions. £12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only). £13

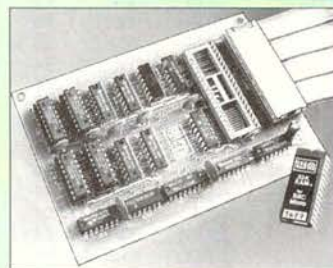
Archi A4 Scanner



The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures. Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity. Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.

- Archi A4 Scanner £199
- Sheet Feeder for above £75
- Scanner + Sheet Feeder £269

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

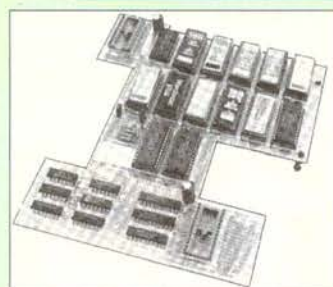
Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

• "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free - 5 times as much as normal.

• In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.

Only £45

Solderless Sideways ROM Socket Board



- Increases your BBC Micro's ROM capacity from 4 to 16.
- No soldering required.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish" allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32

Battery Backup fitted £35

Battery Backup only £3

16K Sideways RAM £8

• Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

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Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

£14

Watford POWER DUCK £8

ROM/RAM Card



- No Soldering required to fit the board.
- Compatible with BBC B
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).

PRICES:

- ROM/RAM card with 32k DRAM £39
- ROM/RAM card with 64k DRAM £52
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OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit £8
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- Read and Write protect switches £2 each
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ROM Cartridges for the BBC Master

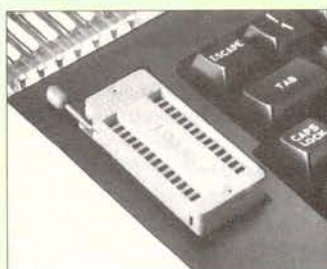
Will accept the larger Piggy Back ROMs like Interword, Quest, etc.

- Twin £9; • Quad £14



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Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without having to open the lid. The ZIF socket is located into the ROM Cartridge's position. It is very simple to install. No soldering required. Also included in the price is a plastic see through storage case with antistatic lining, which allows you to store 12 ROMs.

£18

Acorn Speech Synthesizer package complete, for the BBC B Microcomputer

Special Offer £6

User Port Splitter Unit

Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows you to connect two devices simultaneously to the BBC B & Master user port.

Excellent Value at £22

View Printer Driver ROM

View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

Price: Only £29

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ACORN BASIC 2 plus User Guide	£22
ACORN DNFS	£17
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Acorn OS 1.2	£14
Beebmon	£22
Dump Out 3	£25
Graphics Extension Rom	
GXR-B	£21
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Logotron LOGO	£43
MASTER OS ROM	£38
Master ULA (47)	£15
Master ULA (60)	£10
Numerator - Archi	£69
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Pendown ROM	£32
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Wordwise Plus	£38#
# Price includes a FREE Wordaid Rom	

Word-Aid

This advance utilities ROM extends the power of your Wordwise plus ROM.

Only £24

(N.B. Word Aid requires a Disc interface in your Micro)

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BOOKS (No VAT on Books)

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Spares for BBC Micro

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ACORN to PC

Stop the Confusion!

Do you have to use both Acorn computers and PC's? Would you like to use your Archimedes or A3000 in PC-emulation mode but are unsure of the new commands?

Although Acorn machines (such as the BBC B, the Master, the Archimedes) are mainly used in education, most commercial computers use other operating systems, particularly MS-DOS. As a result school computer users are at a disadvantage when moving into 'business' computing. PCs and other commercial computers use MS-DOS as the operating system, so commands for formatting, copying, backing up, printing and the modem are not the same. Even file names are written differently! And did you know that there is one Acorn command which, if used in MS-DOS, wipes everything in the current directory?

'ACORN TO PC' enables you to change over painlessly. It shows clearly and quickly how, why and where the two systems (Acorn and MS-DOS) differ. As with a foreign language dictionary, you can use the book to transfer either way - from Acorn to MS-DOS, or from MS-DOS to Acorn.

Price: £6.95 (No VAT)

- Official orders accepted from government, educational establishments and PLCs.
- Shop Hours: 9am to 6pm, Monday to Saturday. Late night Thursday until 8pm. Free customer car park.
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Drawn at random

OFTEN I wonder what would happen if all the computer chips on the planet suddenly refused to work and we had to go back to working out our sums with pen and paper. Perhaps our bank statements would be correct.

The same applies to graphics packages on the Archimedes: Take them away and it's doubtful how well any of us would then create decent pictures.

Therefore it is not always a good idea to become too reliant on a sophisticated piece of software without which you may become hopelessly lost when having to resort to drawing things right from scratch.

With this in mind I thought it might be interesting to create a random landscape using a few of the built-in graphics commands producing the scene layer by layer and to keep everything as simple as possible.

Well, looking at the sky, the higher you look the deeper and darker the blue should be (even in Britain) or if you like, the nearer the



sky the less faded it looks. So by using the Tint command we can draw four bands of blue from the top of the screen to the middle getting lighter towards the horizon just by drawing lines – or I could have used RECTANGLE FILL.

It was tempting here to add patterns of dots to simulate a graduated change of shading but sometimes *suggestion* of change is better than the change itself – the mind fills in the blanks

wonderfully. Admittedly, four disparate chunks does not a blue sky make, so thinking ahead I thought I would make the time of day around early evening when the stars are just coming out and the moon is visible.

The moon can obviously be drawn using the CIRCLE command but all phases of the moon can be simulated by drawing first a

yellow circle and then a sky-blue background circle overlapping the yellow by varying degrees.

The program randomly selects how much of the moon will be obscured, from new moon through half, gibbous and full which sound like a row of public houses.

Similar to the method of drawing the sky are the four bands of grass added from the bottom of the screen to the middle again by drawing lines.

Clouding the issue

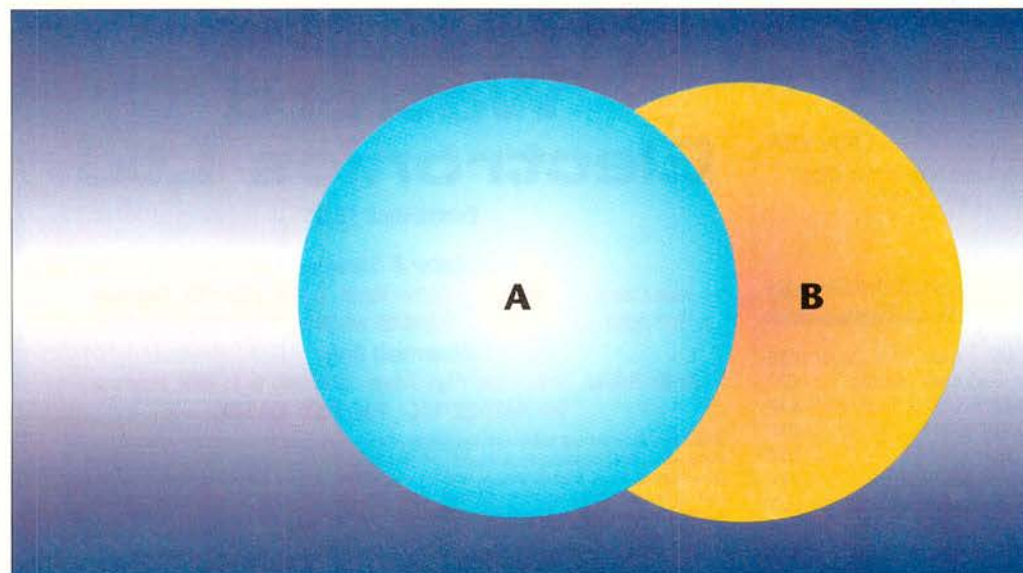
At this stage the scene is still barren and the sky still unconvincing. If it's a British landscape (skyscape?) there have to be clouds – and plenty of big ones. There are various methods of drawing clouds and the one used here is very basic but quite convincing.

By superimposing filled circles of various sizes and tints, a varied batch of fluffy – perhaps even cumulus – clouds can be created and just like real ones you can make out faces and animals if you squint long enough.

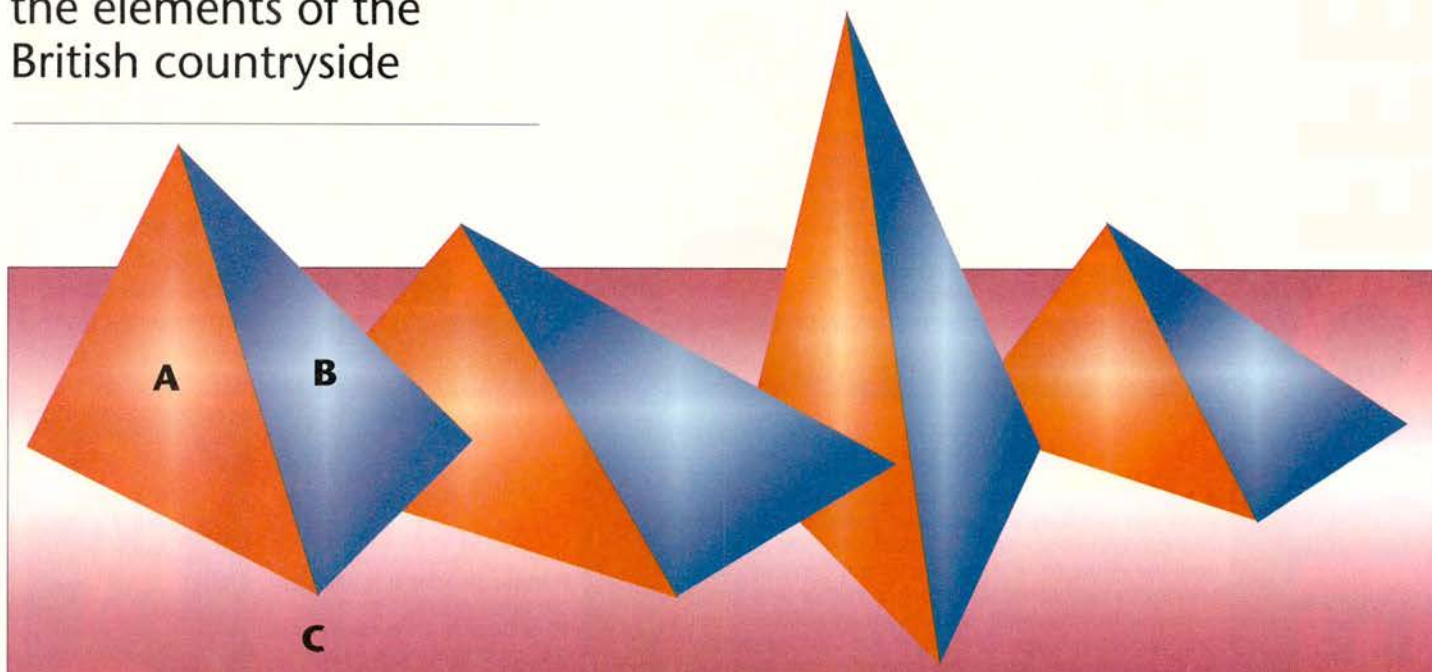
Meanwhile, just by randomly plotting the occasional point of white to the screen, a vault of stars lends that extra touch of realism to the picture.

So far, by using lines, circles and dots and a little imagination we have managed to suggest a 3-D landscape in no time at all. In order to break up the rather stark division

● Drawing circle A over circle B to create various moon phases



Mike Goldberg explores the elements of the British countryside



between sky and ground how about a range of mountains?

Mountains can be formed singly by using the triangle plotting command and further ones are added moving across the screen left to right. Alternating the tint of the purple triangles insures that the mountains have definite and distinct faces and do not look flat.

If there are mountains there will almost certainly be a river at the bottom meandering majestically through the lush verdant sward.

Make a stream by drawing a small blue rectangle at the left of the screen and, moving across, add further rectangles on top of the previous ones sometimes a little higher or lower and always a little to the right until the right edge of the screen.

Tree-mendous!

No landscape would be complete without trees (except maybe a desert) and a good place for them would be at the base of the mountains, which will tidy up the foothills behind the river. Now the trees to be drawn here are definitely of the lollipop variety for which I make no apology.

No attempt has been made to deploy recursive fractal procedures as the name of said method is far more interesting than the results. At least this way you know the trees

were *meant* to look rudimentary.

A simple rectangle is used for the tree trunk and a circle for the foliage – all random size and shade. By making sure the trees overlap you can plant a quaint little copse or dense wood. Add another layer further down the screen to thicken up the timber.

You can bet your life, if there's a wood someone owns it or it's been privatised so there will a fence around it and plenty of *Keep Out* notices. The construction of one part of a fence is just a post and two cross pieces. Just a couple of MOVE and DRAW commands and repeated printing are all that is necessary to make a nice looking fence – I've left off the words.

What else is ubiquitous in the British countryside? Roads. Yes, show me an unspoilt meadow and I'll show you a program that works first time on the Arc. Construct it like the river only using wider rectangles and add a little white line for the centre line – I've left out the traffic cones!

Finally, a small concession to the foreground which was going to be bedecked with all manner of wild flowers and weeds but sadly the nitrates in the soil killed them off. What we do have is a smattering of shrivelled grass made from a series of lines emanating from a single point.

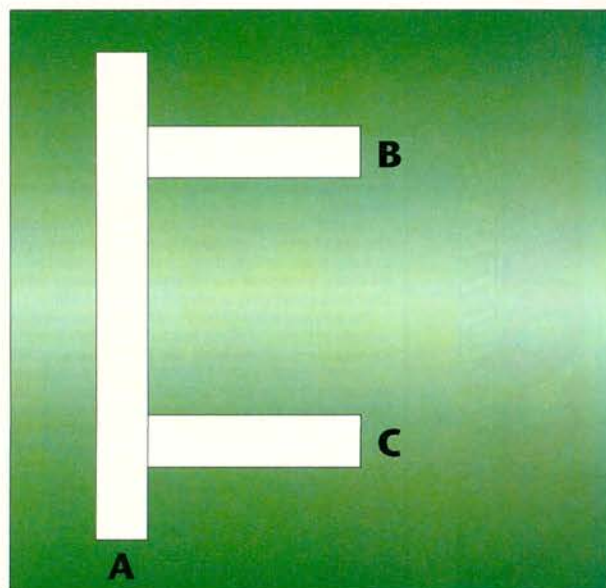
This completes our landscape

using the very basic of graphics tools supplied with the BASIC commands. Even at this level sophisticated pictures can be created and unlike using a paint package there is that extra element of serendipity from using random procedures.

Of course the results lack detail and are schematic but only if the mechanics are understood can bigger and better pictures be created – remember graphics programs are only tools and bad workmen are renowned for blaming them.

● Draw triangle A in one shade and join triangle B to it in another shade. Make sure point C is the lowest point to add depth

● To make a fence, draw line A. Add lines B and C. Repeat the whole thing left to right across the screen



Almanac

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Be in control of your life with Almanac. it will give you the power to plan your life quickly and easily. Almanac is a complete address book for home and business which can keep track of all correspondence, phone calls and E-mail to and from any person, plus automatically display any letters text notes and pictures associated with a communication.

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£70.50

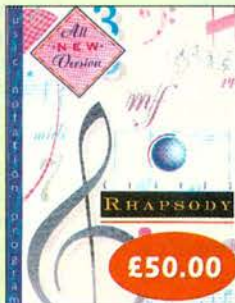
Rhapsody II

A score writing program which has been designed to allow you to create and edit your own musical scores. You can enter your music by hand one note at a time, drag the notes on to the staff or you can even use a Midi instrument to capture music in real or step time.

If you have a Midi instrument attached to your Archimedes you can play a part and then transcribe it on to a staff. This can be repeated and each part entered via the Midi keyboard and transcribed on to the appropriate staff. And of course you can play your score back through the Midi Keyboard.

The package features automatic beaming, up to 24 staves, changes of tempo and volume, ties, triplets, user defined trills and so on.

When your masterpiece is complete you could print the whole score or individual parts in the usual way.



£50.00

Solid Scanning



Why restrict yourself to scanning flat paper? With the revolutionary Iota Image Scanner you can grab a picture of just about anything that will fit on the A4 base.

Because the scanning head is mounted above the base the Iota Image Scanner is ideal for scanning solid objects - just place the object on the base and start scanning.

With the Iota Image Scanner there's no physical contact and no lid to press down so delicate objects can be scanned with ease.

And there are no short cuts with the Iota Image Scanner, it has a full mono resolution of 300 dots per inch with full colour upgrade and fast parallel interface options. With the fast interface it takes just 25 seconds to produce a mono scan and full colour is available in 90 seconds.

With the Image Scanner software - called Image Display - you can change the resolution and contrast of the scanner, plus you can zoom in on any area you want to see in more detail.

Image Display has optional rulers for both axes that match the rulers on the scanning base plus you can cut any option of the scan and export it separately to the rest.



Mono (serial)	£399
Mono (parallel)	£498
Colour (parallel)	£739

Render Bender II

Render Bender II is another top rated graphics package from Clares. It is a powerful ray tracing package which consists of four applications:

Illuminator - a graphical front end to Render Bender which enables you to create Render Bender files using a graphics program similar to Draw.

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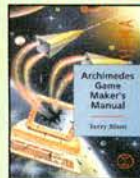
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Charge of the light brigade

Mike Cook explores a new chip with useful features

THE Body Building articles have always been intended as a spring board for your own investigations. This month we're looking at a new sensor that has recently appeared on the market.

I was quite excited when I came across the TSL 214 integrated opto-sensor – it's a chip containing a row of 64 light sensors or, in other words, a linear array of sensors. This isn't new but this one is low in price and simple to use.

Also, conventional linear sensors have their sensing elements, or pixels, quite close together. In this device they are spread out over a distance of 8mm, an altogether much more useful distance.

This has all sorts of potential

applications for measuring the position of something sliding in front of it – in short a linear displacement sensor. I could also see how you could make a bar code reader or even an imaging device.

The conventional way of measuring light is by a photo-resistive effect, where light falling on some material alters its resistivity.

CCD technique

The TSL 214 uses a charge-coupled sensor or CCD technique, the same as in many camcorders. It can be thought of as a *charge bucket*: Light comes along and each photon creates a charge in the sensor, the more light, the more charge is gathered which is read out in the form of a voltage.

The point here is that the voltage you get out is proportional not only to the amount of light shining on the sensor but also to the time you spend gathering the charge. Therefore the sensitivity is controlled by how often you read out the sensor's charge.

With regard to the TSL 214 it means that we can control the sensitivity by how often we read it. There are limits however: We must read out the pixels at a rate between 500KHz and 10KHz but this gives a wide range in sensitivity.

Let's have a look inside this device, Figure 1 shows a block diagram of its function. Conventional CCD sensors use a bucket brigade analogue shift register to output the charge.

This device is somewhat unconventional in that it uses individual selector switches to connect each pixel in turn to the output amplifier which improves the performance.

The device also generates a *dark*

current reference, that is, the amount of charge you would see if there were no light, and subtracts it from the light current through a differential amplifier.

In addition when all 64 pixels have been read out, a clock pulse is generated. This is useful if you want to connect two or more devices to form a long sensor.

The device comes in a standard size IC and the pinout is shown in Figure II. It looks very different from a standard IC, however, because the top is made from transparent plastic. Consequently you can see all the gold connectors and the silver bar that holds the sensors.

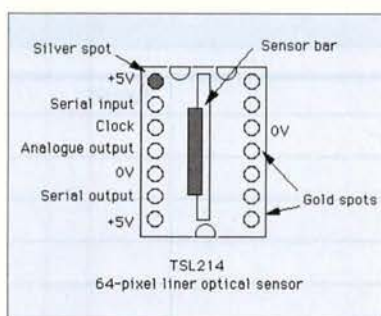
Now over to Figure III. This shows what sorts of waveforms we need to feed into this device and they are basically very simple. We kick things off with pulse on the serial input line which is followed by 64 pulses on the clock line during which the light output is read. Finally the device generates a serial output pulse so we can connect it into the serial input of another device.

The device will not read out any more pixels until we give it another serial input clock.

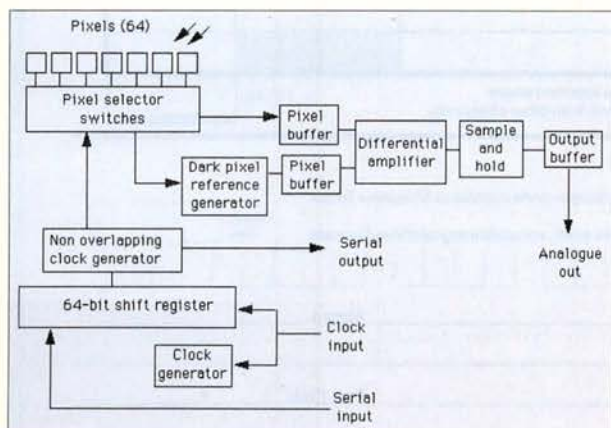
Clock pulse

I started to design a counter circuit that would generate the correct number of pulses but, when I had finished, I realised that we could do most of the work in software. The VIA on the User Port has a counter that will invert the state of bit 7 every time it times out. This can be set to run continuously and is an ideal source for the clock pulse. Also the top speed of the signal is 500KHz – exactly the top speed we need.

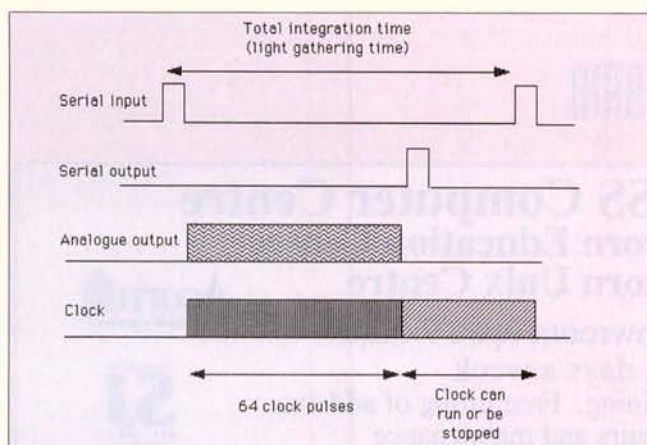
The problem now was to synchronise the serial input pulse



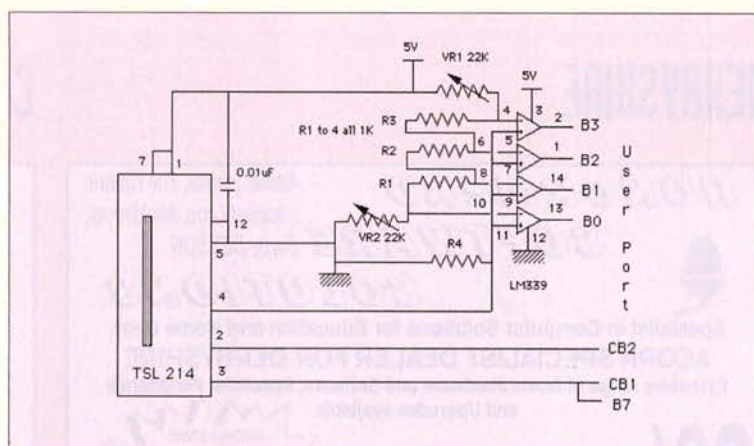
● Figure II: Top view of sensor



● Figure I: Block diagram of linear optical sensor



● Figure III: Waveforms needed for the sensor



● Figure IV: Linear optical sensor interface circuit

and the reading of the data to the clock pulses. Therefore, I decided to connect bit 7 to the CB1 input because CB1 could be made to detect the edge of the pulse and use CB2 as an output to generate the serial input pulse.

Analogue to digital

This left seven bits of the User Port free. I was tempted to put a full 8-bit analogue to digital converter here but three things stopped me: Most applications involving positioning a sensor don't need one, it would slow the clock rate down and the data sheet says the device only has a 4-bit resolution.

However, the output is an analogue voltage so you need a comparator to make it into a digital form. The LM339 chip has four comparators in it so I decided to use them all to make a very small flash converter. This will indicate five different light levels using the four comparators – the full circuit is shown in Figure IV.

Of course the flash converter does not give the output in a binary form but this can be converted in software using a look-up table. The two variable resistors can be adjusted to give the desired spread of output values in response to different light levels.

As we need to gather the data from the sensor quickly this needs to be done in machine code and with the interrupts off. Basically it reads the array four times into a buffer, allows any overcharging of the sensors to settle down, and lets the reading reach a true level.

Then the levels are displayed on the screen using direct memory access for speed. This is then repeated until the spacebar is pressed.

The display is then frozen and the

buffer is analysed: The number of pixels in each level and how far from each end the first pixel change occurs.

You can also alter the sensitivity of the sensor, this simply takes in a number and uses it as the lower 8 bits of the timer. In other words it simply alters the clock frequency. We can't use the full speed of the timer as the software takes some time to gather, convert and store the data between clock pulses.

Therefore, the program adds a constant to the sensitivity reading you enter which is different for the 8-bit and 32-bit machines. Notice that when using the more sensitive settings the response time is slower because you are gathering light for longer.

Automatic adjustment

One thing the software does not do at the moment is to adjust the sensitivity automatically. You can do this quite simply by looking at the number of pixels at the top and bottom level and adjusting the

sensitivity parameter until there are pixels in both levels.

The construction is quite straightforward and all the components are available as Body Build pack No. 86 – this includes veroboard and layout diagram. You will also need some form of connection to the User Port.

This is best done using Body Build packs 1 and 2 which are a board with screw connectors. However, a lower cost option is Body Build pack No.0. This consists of a piece of ribbon cable on a single socket and a screw connector connection block.

You will find that this device is quite sensitive to light – even on the lowest sensitivity you can get a full output with a normal room light. If you try and cover up part of the row of sensors make sure you are using something with a sharp edge and that is truly opaque like a steel rule. If you want to reduce the sensitivity even more you can use filters.

I am sure you will think of lots of uses for this sensor. If not, keep on reading as I am sure I will.

Light comes along and each photon creates a charge in the sensor, the more light, the more charge is gathered

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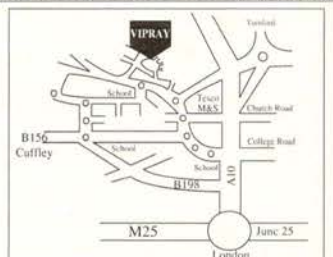
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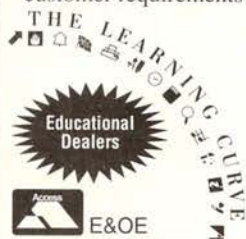
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T-shirt design



I AM in a band called System Exclusive and we have decided that we would like to have a band T-shirt with our logo on it. I have the logo as a drawfile and I wondered if you might know of any companies who could put it on to a shirt for us? – J.M. Hornsby, Torquay, South Devon

● Awards Plus (0761 437043) in Shoscombe near Bath will be able to help. A one-off T-shirt costs about £7.50 plus £2.50 for each colour. We featured the whys and wherefores in an article in our May 1992 issue.

Text must be converted to paths and you'll have to create a PostScript file for every colour by printing to file using the PostScript printer driver.

DrawPlus and Vector use layers and by putting a different colour on each layer you'll find it easier. Otherwise it's a matter of saving the main drawing and then deleting all the parts that aren't the colour you want to print.

Finally, save the files on to a PC disk – if you have an older Acorn machine use Minerva's PC Access, Arxe's MultiFS or PD equivalents.

Reassuringly expensive?



I HAVE been using an A3000 for two years and as I am considering entering higher education, I thought about upgrading to a portable. The A4 would be the most suitable upgrade as I am already Acorn-literate and it appears to have the power and versatility I would require, a worthy feature you would be hard pressed to find in other alien portables.

I am sure that there is a great demand

for a portable Acorn machine so why is the price so different to both other portables and to Acorn models with similar features? The A5000 comes with a higher capacity hard disk, larger and friendly keyboards and multi-sync monitors for less than the A4.

Other portables come with colour screens, high capacity hard disks and larger memories and are usually much cheaper in comparison, with a wider range of software and hardware to choose from. Why do Acorn place their computers so high on the price scale? – Paul van Reenen, Southbourne, Dorset

● In fact, in comparison to the PC market the demand for Acorn portables is tiny which is the sole reason for the price difference. Of course, when you take into account the built-in advantages of the Acorn machine in comparison to PCs – an extremely friendly operating system, powerful compact software, eight-channel stereo sound and so on – the price difference against PCs becomes less significant.

Character codes



I HAVE recently bought an A4000 to replace my BBC B and to work with my printer – a Shinwa CP-80, but I cannot get it to print at the correct size.

As the problem appears to be one of a scale factor I didn't think it would be difficult to solve, but how wrong can you be? After many an hour altering !Printer and searching through the manuals, I think I might have found the problem.

Epson printers can apparently select a graphics mode with Esc * m nl n2 (m for graphic mode) as well as individual

codes, whereas the Shinwa can't.

Is there any way to get the Shinwa working with wordprocessor or DTP packages as I would rather not buy another printer? – A. V. Bator, Luton, Beds

● It is possible to create your own definition file for your printer using the !PrintEdit program that was supplied with your computer. You'll need the Shinwa's technical manual as well.

Using this utility you can specify which codes are used to start and end the graphics modes and what is used when doing text printing. Existing definition files can be used as a basis for the new one.

Beeb bits



I HAVE recently bought a BBC B with a 5.25in Cumana disk drive and no matter what I try I get Error 18 when trying to do anything with my disks of which I have five.

When I read the manuals which accompanied the machine I noticed that I don't have two of the basic disks needed: Cumana formatting and verifying disks. I would be grateful if you could tell me where I could buy these and give me some idea of the price.

I am also looking for a suitable printer. Which is the best for the BBC B? – B.L. Herbert, Mayfield, Dalkeith

● One of the dangers of buying a second-hand computer is the lack of important disks or manuals. This is rarely fatal for a BBC B because of the way the machine was designed in the first place.

A few words of advice: Never buy a computer or software from a car boot sale or

An island too far?



I OWN and use an Archimedes regularly and since I moved from England to the west coast of Ireland I have missed the easy availability of things for my machine as I have to buy most equipment through mail order.

I am fed up with writing endless letters to companies that do not reply. I have made many telephone calls and left messages on answerphones that appear to be unattended.

In the last few months I have become disheartened. I tried to mail order a high quality flat bed scanner (without success) from a UK company who advertise regularly in your magazine.

Another company who had previously supplied me with hardware at the Acorn User show – the hardware no longer works after upgrading my machine to Risc OS 3.10 – have failed to answer my letters or pass on telephone calls to the relevant person.

A third company had supplied me with hardware and software over a period of time. They do not reply to my letters or answerphone requests. This company had promised to contact me with regard to a software

product that was ideal for my business. I had placed a firm order for the product in October 1992 and I am still waiting.

In these recessionary times I find myself wondering how any business can afford to turn away custom. I am beginning to think that it is my Irish address that is the cause of this mystifying disappearance of flourishing companies supplying Acorn Archimedes products.

I will continue to deal with companies in the UK who are prompt and courteous. I have a requirement to spend about £10,000 on Acorn hardware and related products this year.

I have no wish to move to another hardware platform. The companies and individuals referred to in this letter will know who they are. My only sanction is to refuse to deal with them. – Jeff Cable, Galway, Ireland

● We agree that such behaviour in any business is ludicrous and self-destructive. Customer service is the most important aspect of any organisation because without it the punters will not come back. No one can afford to ignore customers even during good times.

similar function unless you know exactly what you are looking for – there is no comeback. Bear in mind the story – probably apocryphal – of the person who bought a keyboard alone from a car boot sale believing it to be a full computer.

Cumana are still producing disk drives for all types of machines – BBCs included – and if you contact them at Pines Trading Estate, Broad Street, Guildford, Surrey GU3 3BH in writing or by phone on 0483 503121 I'm sure they will be able to help.

Probably the best printer for your needs is a standard Epson compatible dot matrix workhorse. The Panasonic range is good value and easily available through mail-order suppliers.

Adventuring in 3.10



I RECENTLY bought an 80Mb hard disk and I am extremely pleased with it and have managed to install

all the software I want with the exception of the games, with which I am experiencing difficulties.

When it came to Wonderland I used the install game which seems to be there but when I try to load it I get:

Illegal address (eg widely outside array bounds)

Postmortem requested

16bc0 in anonymous function ... and on and on

Could you advise me what to do? I wonder if it's because I still only have Risc OS 2. Will Risc OS 3 solve it or does it need something more radical? It was suggested that the Floating Point might be the culprit so I clicked on this but it made no difference.

As for other games, I realise it's a question of trying to change some of the program lines in the !Run files and changing the :0 statements to :IDEFS. Is this correct? – Chris Ayling, Prince Rupert School, Rinteln

● We have consulted the Mad Hatter and he says that the program will run but he assumes you have 1Mb which does present difficulties. Before attempting to run the program make sure you free up as much memory space in the machine as possible: No font cache, no system sprites, no ram disk, RMA down as far as it will go and so on.

There have also been problems with Wonderland and the version of CLib in use. Try reverting to the version distributed with your computer rather than the latest one.

As for your other games, some of these don't recognise an IDEFS and do bear in mind that not all games will run from a hard disk. You should contact the

Sound sampling on the Beeb



AFTER a long time searching for one, I recently bought secondhand a UMI-2B Midi interface for my Beeb designed by L. Naiff and P. Ludgte. I understand they were only available exclusively through the Rockshop in Camden Town in the mid-late eighties.

However, my unit did not come with the rom software to drive it and on the occasions I have approached them about spares, the Rockshop have been no help whatsoever.

Could you please tell me who I could contact to get hold of the items I need – rom and manual? Plus do you know of any sound samplers for the Beeb? – Simon Godfrey, Ealing, London

Ian Waugh replies: Your letter begs the question: How did you manage to buy a UMI without the software? Neither the hardware nor rom are a lot of use on their own.

Never mind. Lynton Naiff is still supporting the UMI range of hardware and software. If you get in touch

with him, he will see what you require and try to help. He's at 17 Parkfields, London SW15 6NH.

The problem with sampling on the Beeb is that the process requires lots of memory and the Beeb's rather meagre 32k doesn't give you much room – or rom – to play with. But that didn't stop developers.

A company called BML Electronics produced a sampler but that was years ago and it has since gone the way of most BBC add-ons. If any reader has one which they would like to get rid of, let us know and we'll pass your letter on to Simon.

Mike Cook, designed a sampler for the Beeb – in fact all Acorn machines – and details can be found in *The Micro User* from issues December 1991 to March 1992. The March 1993 issue carried a sampler driver program for the BBC Micro which is worth looking at.

Time and technology march on and the Beeb is now showing its age, especially in areas such as music and sampling. If you're really interested in the subject, you'll find an up-to-date 16 or 32-bit computer will give you more scope.

manufacturers to see if a more recent version behaves correctly.

For those that do, but look for an ADFS hard disk, follow this procedure: Where you find ADFS::0 change to IDEFS::4. This will not change file reference within the program itself, of course, so is no guarantee.

Lack of support



I HAVE an A3020 with 2Mb of ram and a 60Mb hard disk for which I bought Mig 29 only to find that I could not get past the password section.

Apparently it works on the A3000 with Risc OS 2 and on the A5000 with Risc OS 3.00 but not under Risc OS 3.10.

Domark are not interested in updating the software to make it work, unlike Clares who will update their Interdictor II for a small fee – it also exhibited the same problem with the password system. Could you shed any light on this and has anyone else experienced this problem?

Finally, is there a World War II submarine simulator which will work on my A3020? – G.R. West, Fakenham, Norfolk

● The problem with Interdictor II and Mig 29 is the same, as they were both programmed by the same company, Simis of Flight Sim Toolkit fame. Domark have really only tested the water with their Acorn products – their main interests are with other formats.

Quite a number of games refused to work under Risc OS 3.10 but Acorn helped most companies sort out the problems. If Domark's contract with the programming house didn't extend to updates then

economics probably dictate that there is no point in updating for Risc OS 3.1.

The same applies to Domark's 3D Construction Kit although I have been told that if you turn off Risc OS 3.10's inherent screen blanking this solves the problem.

If simulators interest you, I'd contact Turcan Research (071-625 8455). They produce Dreadnoughts and even though it's not a submarine simulation and it's set in World War I, it's a excellent reconstruction of the battle of Jutland among others.

ABC of programming



I OWN a BBC B and would like to learn to program in C. Are there any C language packages for the BBC?

Which would you recommend?

I have seen in Watford Electronics' advert, a rom called Acornsoft C Disk. Is this a rom and how good is it? Finally is the DabHand Guide to C from Dabs Press relevant to me? – David Hearn, Sittingbourne, Kent

● Most software houses are now developing for the 32-bit Acorn as you're probably aware so there are a variety of Cs available here as well as books to help.

The Dabs Press DabHand Guide to C by Mark Burgess is generic with sections relevant to all machines including the BBC B although, as it's a few years old, its coverage of C for the 32-bit Acorn machines is a bit dated.

Watford do still sell their version of C on disk for £28 + VAT and I think this is your only choice now. Beebug used to sell a version too but no longer, though you may be able to pick up one of these through the classifieds section.

Want to write to us? The address is:

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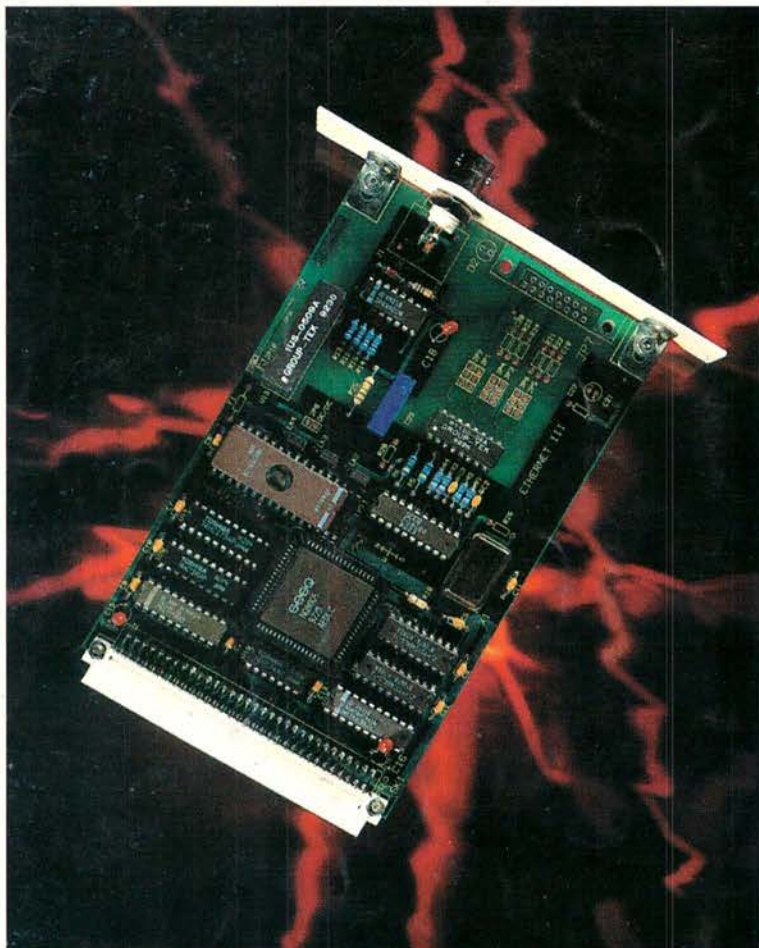


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